Community resistance to climate change: Discourses of Tasmanian farmers

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Declaration

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Abstract

Climate change is a major issue for agriculture. Changes in farming practices will be necessary to reduce emissions and to adapt to a changing climate and to new social expectations. The way the agricultural community is able to respond is particularly important for the promotion of action. This thesis examines farmers' responses and resistance to climate change, with the primary aim to improve relevant communication in agricultural extension. The research demonstrates how the use of discourse analysis creates opportunities to increase the agency of farmers and overcome resistance to change.

An examination of the published literature on climate change communication and behaviour demonstrates that currently the literature constructs three dominant discourses. A review using the principles of critical literacy illustrates the ways in which these discourses create resistance in farming communities and shows that the discourses in the literature do not include the views of farmers. Consequently, this thesis develops discourses specific to two Tasmanian farming communities developed from interviews conducted in 2008. The 68 respondents included 22 apple growers, 29 dairy farmers, 12 agricultural consultants and 5 climate scientists working on fine scale climate projections for agriculture.

This research is cross-disciplinary in its application of poststructural theory in an agricultural context, and in its use of discourse analysis techniques to examine farmers' capacities to act and their resistance to change. The discourse analysis is informed by poststructural theory with a focus on language, individual capacities for action and possibilities for change. The study uses constructivist grounded theory (Charmaz 2006) and a genealogical discourse analysis (Carabine 2001) to construct four dominant discourses which inform farmers' perspectives of climate change. Farmers are located across the range of these discourses. The discourses are the Discourse of Money, an issue of business viability; the Discourse of The Earth, an environmental concern; The Discourse of Human Responsibility, a call for social action; and the Discourse of Questioning, a problem of trust and

information. The features and competing concerns of each discourse contribute to resistance to act on climate change by limiting farmers' possibilities for action. Practitioners working on agricultural policy and extension programs involving climate change can improve their methods of communication by varying their approaches based on the knowledge of how different discourses shape farmers' responses.

The key proposition of the thesis is to argue for multiple understandings of climate change and the potential of awareness of discourse to increase the agency of farmers in relation to climate change.

Publications deriving from this thesis

Peer reviewed journal articles and book chapters:

Fleming, A & Vanclay, F 2009a, 'Discourses of climate change: understanding farmer resistance' in J Martin, M Rogers & C Winter (eds), *Climate change responses across regional Australia: social learning and adaptation*, VURRN Press, Ballarat, pp. 155-176.

Fleming, A & Vanclay, F 2009b, 'Using discourse analysis to better inform the practice of extension' *Extension Farming Systems Journal*, vol. 5, no. 1, pp. 1-10.

Fleming, A & Vanclay, F 2010, 'Farmer responses to climate change and sustainable agriculture: a review', *Agronomy for Sustainable Development* vol. 30, no. 1, pp. 11-19.

Other:

Submission to the Inquiry into the role of government in assisting Australian farmers to adapt to the impacts of climate change, March 2009, available at: http://www.aph.gov.au/HOUSE/committee/pir/australianfarmers/subs/sub002.pdf

'Communicating climate change in the agricultural sector' Antarctic Climate and Ecosystems Cooperative Research Centre, University of Tasmania, Hobart, November 2009.

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Glossary of terms, acronyms and abbreviations

ABARE is the Australia Bureau of Agricultural and Resource Economics.

Adaptation is changes in practices that aim to reduce the adverse impacts of on anticipated or actual change in the operating environment and take advantage of any opportunities that may arise (Gunasekera 2007, p. 498).

Agency is how an individual is able to act, including awareness of options and capacity to implement those options.

APEN is the Australasia Pacific Extension Network.

ARIES is the Australian Research Institute in Education for Sustainability.

CFT is the Climate Futures for Tasmania project.

CSIRO is the Commonwealth Scientific and Industrial Research Organisation.

CO_2 is carbon dioxide. When it is written CO_2, it is because the interviewee said the letters and the number, instead of the words carbon dioxide.

CPRS is the carbon pollution reduction scheme in Australia that is similar to emissions trading.

Critical literacy is a theory and method of teaching that foregrounds issues of power and positioning in learning and aims to open up possibilities for other, multiple, alternatives.

Discourse is a particular use of language. 'A **discourse** provides a set of possible statements about a given area, and organises and gives structure to the manner in which a particular topic, object, process is to be talked about. In that it provides descriptions, rules, permissions and prohibitions of social and individual actions' (Kress 1985, p. 7).

Discursive is the adjective term for discourse and means created by discourse.

DPIPWE is the Department of Primary Industries, Parks, Water and Environment.

DPIW is the Department of Primary Industries and Water.

EFS is education for sustainability. EFS is a particular educational philosophy.

Extension is 'the process of enabling changes in individuals, communities and industries involved with primary industries and natural resource management' (SELN 2006, p. 3).

Extensionist, **extension officer** or **extension agent**, is a person who works with agricultural communities in facilitating change and therefore engages in the practices of extension.

Farmer means the farm family unit/business.

Gender is the 'socially constructed identities, roles and expectations associated with males and females' (Patt et al. 2009, p. 83).

Ideology is what society values as truth and the truth effects created by particular discourses.

IPCC is the United Nations' Intergovernmental Panel on Climate Change. The IPCC produces reports on climate change for governments collated from the scientific data.

Mitigation is human intervention to reduce the sources or enhance the sinks of greenhouse gases (Gunasekera 2007).

Myths are stories that capture familiar assumptions about reality (Hulme 2009)

Poststructural is the theoretical framework for this research, where the implications of language are privileged and multiple views encouraged.

Resistance is a potential site for change and transformation, 'the means through which individuals change social processes and structures and build alternatives' (Sage 2007, para. 2).

SELN is the State Extension leaders Network.

Scripts are words that people latch on to from public discourses that justify their own views such as 'climate change is just a natural cycle'. Scripts and agriculture are explored by Vanclay & Silvasti (2009) and Vanclay et al. (2007).

Subject position, or **subjectivity** is how an individual actively constructs themselves as a subject and understands themselves as a person, through the discourses that they are embedded in.

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Preface

I first became concerned with climate change through the media when it was already an established issue in the science. I was struck by the level of confusion and anxiety and the lack of decisive action. I wanted to help improve communication and learning about climate change using my training as a teacher.

I have always lived in Tasmania and associated strongly with it and I felt that the people most at risk of climate change in Tasmania were farmers. In 2007 farmers were dealing with an unprecedented extended drought and they seemed particularly vulnerable to many other impacts of climate change. When it was suggested that I compare two different agricultural industries, the dairy and apple industries, I was intrigued. How would the two industries approach climate change? Coming as I did from a background outside of climate change science or agriculture, I expected that farmers would probably know far more about climate change than I and I was fascinated to find out what farmers thought and how they were learning and changing.

Over the course of my research, several issues seemed to me to be strikingly similar between my new context researching farmers' views of climate change and my previous context of teaching. The first was the importance of language and the way different uses of language can have a profound and fundamental impact on the way we view the world, our place, and our capacity to act. The second was the importance of valuing different types of knowledge in order to help people to change. Just as it had been important for me to recognise that students in the classroom already had valuable knowledge, I found that recognition of farmers' own ways of framing issues, problems and solutions for climate change was crucial to understanding their reasons for action and resistance. Recognition of farmers' perspectives can help people working to communicate climate change to engage with farmers. It is the goal of this research to provide this recognition and to improve climate change understandings, communication, learning and action.

CHAPTER 1

Key concepts and overview: discourse, resistance, agricultural extension

In 2007, the United Nations Intergovernmental Panel on Climate Change stated that warming of the climate system was 'unequivocal' (IPCC 2007, p. 5). Furthermore, this warming was recognised as caused predominantly by increased levels of carbon dioxide in the atmosphere as a result of human activity, primarily the use of fossil fuels (IPCC 2007). This statement was expected to mobilise immediate action to combat climate change, at all levels. Nevertheless, failure to agree on international action at the United Nations conference on climate change in Copenhagen in 2009, illustrates that there continues to be resistance to unified action at a government level. Although the science of climate change and the broad social consequences of inaction have been widely discussed in both academic and popular media, the way governments develop a collective understanding of relevant information is an important influence on the rest of society's motivation and ability to act.

At a national level in Australia, discussions of the impacts of climate change on economic and community well-being indicate that Australian agriculture will be among the most affected industrial sectors (ABARE 2007; Garnaut 2008). As a result, and in order to prevent the worst impacts, state and federal government agencies and policy makers are pressing farmers to change practices to reduce further greenhouse gas emissions and to adapt to the consequences of climate change that will inevitably occur (Garnaut 2008; Gunasekera et al. 2007). Despite this, to date, there is little evidence of progress, with agriculture remaining outside the proposed national carbon pollution reduction scheme or CPRS.

Essential knowledge for those wishing to promote action appears to be how the agricultural community understands climate change and feels able or otherwise to act. As Vanclay (2004, p. 213) states: 'Agriculture is farming and farming is people', however, social understandings of climate change and agriculture continue to be under-researched, especially in Australia (CSIRO 2008; Trumbo & Shanahan 2000).

Farmers' perceptions of climate change are important to consider in understanding individual and collective resistance to changing farming practices. This thesis explores resistance to change in response to, or anticipation of climate change, within two Tasmanian farming communities. The study is based on the primary argument that different understandings of climate change create different perceptions of how it is possible and desirable to act. These different understandings create particular types of resistance to actions promoted by external authorities such as government agencies. Instead of advocating any one particular understanding of climate change, the study takes a poststructural view that encouragement of multiple understandings will create more possibilities for action.

Poststructural theory is centrally concerned with language, the effects of language and alternative possibilities for thought. The way language is used about climate change in different contexts has important consequences which are currently not being fully recognised in policy development on climate change and agriculture. In other contexts, for example education and gender studies (Butler 1990, 1993; Davies 1993; Hiller 1998), language and language effects have been examined by analysis of discourse. In contrast to positivist or psychological approaches, poststructural theory advocates an examination of discourse as more useful for understanding behaviour than examining perceptions, opinions or behaviours in isolation. Poststructural theory contends that individuals are constituted within discourse and discourses are an opportunity for change as: 'discourse constrains action but also opens up ways to recreate society' (Hajer 1995, p. 263).

Discourses are different ways of using language in different situations:

> A discourse provides a set of possible statements about a given area, and organises and gives structure to the manner in which a particular topic, object, process is to be talked about. In that it provides descriptions, rules, permissions and prohibitions of social and individual actions (Kress 1985, p. 7).

Different uses of language in discourse construct different forms of knowledge. Consequently, in dealing with farmers on the complex technical and social issues around climate change, it is not useful to examine resistance at an individual level because resistance is constructed at the level of discourse. Thus, although the term resistance is usually applied to inaction or refusal to act and perceived as a problem to overcome, in poststructural theory, resistance demonstrates alternative possibilities for action. Therefore, resistance is viewed positively as it is a potential site for change and transformation, 'the means through which individuals change social processes and structures and build alternatives' (Sage 2007, para. 2).

Kress (1985) writes about two types of change that can be achieved through an examination of discourse. The first is social change brought about through changing discourses, where discourse is particular uses of language that shape thought and action. The second is individual change brought about by changing the range of possible subject positions people can access. The term subjectivity is used to describe subject position and how an individual constitutes themselves within discourses, while how a person is able to act is described as agency. Within poststructural theory, awareness of discourse and resistance are central to understanding individual subjectivity and agency.

Kress (1985) argues that changing language can bring about changes in social discourses and through this change the possibilities for individual subjectivities and agency. As wide scale changes are needed to create broader action to cope with the anticipated effects of climate change (Moser & Dilling 2007), changing discourses to change society is one focus of this research. The central concern, however, is with farmers' abilities to act in response to climate change, therefore,

the most important focus is on understanding farmers' current discourses relating to climate change and through this their possibilities for subjectivity, agency and action.

In communicating climate change research, there is a need to recognise the different discourses that are present and how meanings and actions change for different social groups within these discourses. In emphasising the value of examining different social constructions of climate change through different discourses, potential practical benefits can be created for facilitating behaviour change.

Research aims

The purpose of this research is to benefit farmers by examining how their understandings of climate change affect their opportunities for action. The research is theoretical as it aims to contribute to understandings of behaviour change and resistance to change. This is achieved by describing the discourses in which farmers are constructing their subject positions in relation to climate change. The research is also practical as it aims to demonstrate how more diverse understandings of climate change can lead to improved communication and increase the range of actions that are able to taken. This is intended to be particularly relevant for farmers and people working with farmers on climate change, including in extension and policy.

The use of language in farmers' discourses of climate change and the effects of this on farmers' actions is the focus of this research. Exploring the reasons farmers might resist practice changes in response to climate change is the primary aim. It is intended that this research will provide new insights for those working with farmers to facilitate change. Awareness of the multiple discourses of climate change currently shaping farmers' possibilities for action creates opportunity to learn how discourses might be transformed to increase opportunities for agency and change.

This research aims to discover the socially constructed reasons for farmer resistance to changing practices to address or respond to climate change, that is, the discourses which limit farmers' agency to act to combat climate change and to prepare for the effects of climate change. Current discourses of climate change limit farmers' subjectivities and possibilities for action and changing discourse can change the available options for farmers to act. Examining resistance is a useful technique allowing the workings of discourse to be recognised and then potentially changed. As awareness of discourse and resistance is so useful for understanding farmers' abilities to act, it is recommended that extension acknowledge discourse. One method for achieving this that could be easily applied to extension is through connection with critical literacy (Anstey & Bull 2004; Luke 2000; Rowan 2001). Connections between the theories of discourse, critical literacy and extension can allow those with an extension role to empower farmers to transform their subjectivities and increase their potential agency.

Chapter overview

This chapter introduces discourse and resistance and why they are useful in research examining behaviour and change. It also discusses the particular role of agriculture and how examining discourse within a poststructural theory can benefit advisors and policy makers working with farmers. Critical literacy and how it might be used to benefit extension is introduced. The data, methods of analysis, overview of the results and implications as well as the structure of the thesis are also outlined.

Discourses

The French poststructural theorist, Michel Foucault, is credited with the recognition of the different ways that language constructs meaning as 'discourse' (Foucault 1972, 1979, 1980, 1982). Foucault maintained that the way language is used has consequences for a whole range of ideas over and above the level of individuals or disciplines. Discourses shape and limit how people are able to

speak, think and act and through this, the social structures that are developed. Kress (1985, p. 7) rewrites Foucault's ideas as:

> Discourses are systematically organised sets of statements which give expression to the meanings and values of an institution. Beyond that, they define, describe and delimit what it is possible to say and not possible to say (and by extension – what it is possible to do or not to do) with respect to the area of concern of that institution.

According to Foucault, discourses enact a whole range of relationships between power, truth, subjectivity, knowledge and resistance. Thus, discourses are more than words: 'It is this 'more' that we must reveal and describe' (Foucault 1972, p. 49).

In poststructural theory, discourses are useful ways to examine how language is used to construct subject positions. Discourses shape how it is possible to speak and act in different situations. Exposure to particular discourses over time constructs views about what is right and wrong, normal or abnormal and thus discourses significantly shape ideology and how it is possible to think. By establishing limits of thought and creating meaning, discourses construct who is powerful, who is not, what is possible and what is impossible. Therefore, discourses have significant influence on how individual's construct their subjectivity and how they enact power and agency, 'command of different types of discourse … is seen to denote competence, and through competence, power' (O'Kane et al. 2008, p. 194).

Discourses are powerful social and cultural ways of shaping what it is possible to say, do and think, but they are not incontestable or unchangeable (Kress 1985). Individual subjectivities are constituted within discourse but discourses are dynamic and changeable and therefore subjectivities are not 'trapped and condemned' (Foucault 1980, p. 142). From multiple forms of discourses, people can become aware of them and choose between them. This is a view advocated by poststructural theory, which departs from Foucault's understandings of

discourse as it is seen to be possible for individuals to actively contribute to changing discourse (Davies 1993; Dryzek 1997; Kress 1985; Morgan et al. 1996).

In many poststructural interpretations of Foucault, discourses are multiple, variable and comprehensible. 'People live and act not just within one discourse … They live among a number of discourses; and so they may be able to negotiate what position they will take up' (Morgan et al. 1996, p. 70). Understanding the particular discourses relevant in particular situations is therefore empowering and creates opportunity for human agency within, movement between, or direct influence on, the discourse encountered. With awareness of different discourses, individuals:

> can continue to speak/write into existence those same structures through those same discourses … they can also invent, invert and break old structures and patterns and discourses and thus speak/write into existence other ways of being (Davies 1993, p. xviii).

Discourses work toward normalisation, that is, each discourse presents a particular perspective as the only way to understand the world. This causes discourses to conflict with each other.

> Discourses tend towards exhaustiveness and inclusiveness; that is, they attempt to account not only for an area of immediate concern to an institution, but attempt to account for increasingly wider areas of concern (Kress 1985, p. 7).

How discourses work toward normalisation is only revealed with analysis that is mindful of context, locality and temporality because 'only detailed, localised studies of events' (Darier 1999, p. 18) can allow for distinctions to be made between what aspects of discourse are enacted to normalise and what aspects resist normalisation and so create sites for potential change.

The way language constructs different understandings of reality is crucial to the study of discourses. Through naming and describing both concrete and abstract aspects of the world, knowledge is constructed. This knowledge enables action in ways that would have been different if different discourses had shaped those understandings. The ways that language is used to establish different truths and

shape possibilities of thought, belief and action is central to the study of discourses. In this way, discourses are interconnected with ideology because discourses 'define and establish what truth is at particular moments' (Carabine 2001, p. 268). They:

> organise our knowledge, our beliefs and desires and our conscious and unconscious thoughts and attitudes, in such a way as to maintain particular social and cultural arrangements (Morgan et al. 1996, p. 70).

Ideologies are expressed in discourse but it is discourses, rather than ideologies, that are the focus of this thesis because the effects of discourse are more material and more able to be influenced for action and change.

Discourses have significant effects on who can access, use and produce the language of truth and power. Therefore, 'those who adopt a discourse approach seek to interpret how discourses emerge and uncover the process of power and knowledge formation' (Pettenger 2007, p. 10). Awareness of the effects of discourses allows truth and power relationships to be explored and reconsidered so that new ways to frame problems, new solutions and new possibilities for action become possible.

Farmers' beliefs about climate change are linked to different views constructed through particular discourses. For example, climate change is constructed differently by science (Sarewitz 2004); the media (Boykoff 2008; Carvalho 2007); politics (Bäckstrand & Lövbrand 2007; Oels 2005); and environmental education (Clover & Hill 2003). Each of these different disciplines advocates one discourse of climate change and one set of solutions over another. Instead of championing any one particular discourse, multiple perspectives within multiple discourses need to be encouraged to address the wide ranging aspects of the problems created by climate change and to increase farmers' possibilities for subjectivity, agency and action.

Understanding discourses: understanding change

Discourses are different ways of using language in different situations and different uses of language in discourse construct different forms of knowledge. This means that language use, embedded in discourse, is not separate to the social reality or behaviour in which it occurs but actually co-constitutive of it.

> Many social researchers today would argue that people's understandings of the world are not merely expressed in their discourse but actually shaped by the ways of using language which people have available to them. Another way of putting this is to say that reality is 'discursively constructed', made and remade as people talk about things using the 'discourses' they have access to (Cameron 2001, p. 15).

Discourses are powerful because it is through discourses that meanings are attached to language. This means that knowing the necessary practices of a particular discourse and having access to the discourses that are dominant in society, gives an individual power: 'It is in discourse that power and knowledge are joined together' (Foucault 1979, p. 100). Each discourse also enacts power by limiting which individuals can and cannot participate and by defining who or what is deemed powerful. Language has power beyond the meaning of individual words; rather it is within discourse that particular words are made meaningful and powerful. The way farmers use language to create discourses around climate change and the consequences of this for their possibilities for subjectivity, agency and ability to act, is the central focus of this research.

Resistance among discourses is an opportunity for change. Resistance allows the limitations imposed by current discourses to be made more apparent and alternative discourses to be created. In society at any point in time, multiple discourses exist simultaneously. While it is generally accepted that overlaps between discourses create opportunity for choice and agency (Davies 1993; Dryzek 1997; Morgan et al. 1996), it can be argued that resistance between discourses is another, more frequent opportunity for agency. 'Discourses always contain within them the possibility of resistance ... resistance can be the means by

which power is re-authorised and dominant discourses reconstituted' (Gatenby & Hume 2004, p. 270).

Resistance is always found where discourses overlap and clash because discourses work to enact power and power and resistance are always intertwined: 'Where there is power, there is resistance and yet, or rather consequently, this resistance is never in a position of exteriority in relation to power' (Foucault 1979, p. 95). Resistance is not only created as an effect of power however, (Macdonell 1986), rather, resistance is also an effect of conflicts of discourses so powerful discourses often have powerful resisting discourses. Discourses are dynamic entities, shifting, merging, fading and re-emerging, therefore, discourses are always able to be changed:

> No discourse can ever be neutral; it is always involved in circulating and promoting one form of knowledge, of values, of ways of being and living over another; it is involved therefore in promoting the interests of a particular social group (Morgan et al. 1996, p. 71).

Research into understanding human behaviour and facilitating social change should take language and discourse into account. Analysis and reconsideration of discourse is a high-level but highly effective point of action for change because discourse is so pervasive and fundamental to how people make meaning. Understanding how discourses create resistance and how the process of creating new discourses occurs is an opportunity for creating new possibilities for subjectivity, agency, thought and action.

Key concepts in discourse theory

In discourse theory, resistance and agency are constructed at the level of discourse. Analysis of these is a crucial way to understand individuals' subjectivities and opportunities for change. As Kress (1985) argues, it is through changing discourses that social change and individual change can be achieved. Subjectivity is taken to be how an individual constructs themselves in relation to the discourses to which they have access. Subjectivity is 'the ideological,

discursive and generic position of individual speakers, in other words … the 'linguistic make-up' of individuals' (Kress 1985, p. 86). Subjectivity is therefore an active, dynamic process that can change. Through awareness of discourse, people can better understand the processes through which they create their subject positions and they can begin to actively influence them. This process connects with an individual's agency as awareness of subject positions and ability to influence them increases agency to act.

In poststructural theory, the subject is not predetermined but is continually being constructed within and across different discourses (Butler 1993; Davies 1993; Hiller 1998). Therefore, awareness of discourses is an opportunity for empowerment and change and important for those wishing to promote behaviour change to acknowledge:

> Awareness of the nature of discourse, discursive practices and how discourses make available a range of subject positions allows the individual agency to move among multiple discourses and open spaces for change (Hiller 1998, p. 8).

This research argues that resistance is a process by which discourses can be made more apparent and awareness of discourses creates opportunity for agency. Therefore, resistance is positively connected with increasing agency:

> Agency is never freedom from discursive constitution of self. Rather it is the capacity to recognize that constitution and to resist, subvert and change the discourses themselves through which one is being constituted (Davies 2004, p. 4).

Resistance and agency are intertwined (Darier 1999; Davies 1993), and therefore possibilities of resistance are important to examine in research into action for climate change.

By significantly changing language and discourse it is possible to change people's thoughts and actions, power relationships and their results. 'Structural changes in society can be conceptualised as shifts in the relative influence of different discourses' (Sharp & Richardson 2001, p. 196). As an example, Foucault (1979) describes the development of a new discourse of population.

Foucault explains how population suddenly became more than a term to describe a number of people. It became a political, economical and social problem and an object that could be acted on in ways that had significant consequences. Fertility rates, marriage statistics and births became part of new discourses about population and for the first time sex became involved in new forms of political, economical and social discourse. 'Between the state and the individual, sex became an issue, and a public issue no less; a whole web of discourses, special knowledges, analyses, and injunctions settled upon it' (Foucault 1979, p. 26). Foucault's example shows how societal changes are created when changes in discourse alter what is talked about and how issues are thought about and acted upon.

Now, climate change provides another example of how new discourses can develop and have powerful effects. The term climate change is provoking another explosion of spoken and written texts and a range of new discourses. The creation of an array of discourses about climate change alters what is being talked about, thought about and done in society. Examples of new language stimulating new discourses because of climate change include: carbon neutral, carbon trading, carbon pollution, carbon footprint, climate action, climate friendly and many more. The way that these words are only now meaningful and powerful within society, shows how power does not come from within words but from the context in which words are used and the ways that meaning is socially constructed in discourse. 'The ability to create new names, new categories, is therefore one with powerful consequences' (Kress 1985, p. 61). The way language is used to create discourses around climate change and the consequences of this for farmers, is a new area of research that has a great deal of potential for improving farmers' agency to act in anticipation and response to climate change.

Discourses of climate change

Many scholars have argued that climate change is socially constructed (Dryzek 1997; Hajer 1995; Pettenger 2007), so how climate change is understood varies

across different groups of people and across different discourses. Common constructions are either that climate change is a controversial, political issue or that it is an environmental problem (Boykoff 2008; Carvalho 2007; Hulme 2009). Environmental problems are always changing, in understanding, significance, prevalence, policy and law (Dryzek 1997; Hajer 1995). Climate change is no exception and it already has a long history of waxing and waning in social consciousness (Ungar 1992).

Demeritt (1998) claims that climate change was first introduced in ancient Greece. The more widely accepted view, however, is that in 1824 Fourier wrote the first essay on planet temperatures and from 1859 Tyndall developed the first scientific experiments and publications on greenhouse gases and climate change (Hulme 2009). These publications are most widely considered to be the beginnings of climate change research and scientific understanding. Now, climate change is more prevalent in the public consciousness than ever, receiving attention from almost all social arenas: academia, agriculture, consumer markets, education, politics, religion, science and the media. Climate change is socially constructed differently by each of these groups. For example, science may typically construct climate change as physical changes in the composition of gases in the atmosphere (Flannery 2005); while agriculture commonly constructs climate change as the impacts on weather and growing conditions (ABARE 2007). Other social groups construct climate change in ways that promote particular issues important to them, yet the discourses that are at work in these different contexts are not always recognised and therefore their effects are not sufficiently acknowledged.

The social construction of the problem of climate change is fundamentally a conflict over what the knowledge and facts of climate change are and who has the power to produce them (Carvalho 2007). It is a conflict of discourses. Developing an understanding of the particular discourses present in particular social groups is essential for research about climate change because different discourses alter what climate change is thought to be and what it means can and should be done.

Therefore, public knowledge about climate change and action to be taken, or the likely resistance created, is dependent upon the context of the local, multiple, social constructions of climate change (Darier 1999).

When differences in the social construction of climate change within discourse are explored, more solutions become apparent and multiple sites of agency are created. As Irwin (2001) states, multiple framings of problems can lead to multiple possible solutions being realised. A focus on particular social responses to climate change can provide new insights into what climate change means and what solutions can be created. This is especially useful for promoting behaviour change because of climate change.

Resistance

Resistance and agency are created by discourse and as such are most apparent when different discourses conflict. As such, resistance is an opportunity for transforming discourse and an avenue for promoting agency to move among discourses. Resistance, according to Foucault, is a means and a process, it is dynamic and changeable. It occurs wherever there are power relations and power relations occur wherever there is society:

> there are no relations of power without resistances; the latter are all the more effective because they are formed right at the point where relations of power are exercised; resistance to power does not have to come from elsewhere to be real … it exists all the more by being in the same place as power; hence like power, resistance is multiple (Foucault 1980, p. 142).

Power and resistance are not opposing forces but are intertwined with all other kinds of relations that exist in society: ‘Power relations are rooted in the system of social networks’ (Foucault 1982, p. 793). They are not simply repressive or productive, they may be both or either, in different ways at different times and in different situations, so it is necessary to understand the context of particular discourses in order to understand resistance (Darier 1999).

Reasons for resistance can occur at the level of the individual, infrastructure or societal norms but resistance can also occur at the level of discourse. This means that the causes of resistance are highly complex and interrelated. It is arguable that there is limited value in examining individual, infrastructure or normative causes of resistance without exploring discourse because discourse influences all of these other causes of resistance.

Understanding resistance to change at the discursive and social levels is crucial to a full understanding of behaviour and essential in understanding resistance and enabling transformative change. This research seeks to provide a discursive and social exploration of the reasons farmers might resist practice changes to address climate change and through this, to provide new insights for extension practice and policy, into how management of climate change could be better facilitated.

Resistance to changing behaviour is discussed in the research literature in different ways. Often it is discussed as barriers to change and it is usually studied at the individual and external levels (see Moser & Dilling 2007 and Vanclay 2004 for a comprehensive listing). Resistance is less commonly explored at the social and discursive levels, with Kurz et al. (2005) and Lorenzoni et al. (2007) being the only exceptions identified by this research. Constructions of resistance in the literature and the effect on farmers' capacities to act are discussed in Chapter Two.

A better understanding of the reasons for resistance to action on climate change offers a potential way to increase understanding of farmers' alternatives for action. 'Simply trying to motivate people to change behaviour without acknowledging the real barriers in the way of change will have little success' (Moser & Dilling 2007, p. 494). This is especially the case if the barriers are created by discourses and therefore not always acknowledged or known.

With resistance comes the possibility of reconstruction and change because resistance creates alternatives to the dominant discourses in society. Resistance

and power are not contained within individual things, places or people and so resistance is best made visible through an analysis of discourse. Discourses reveal how power and resistance work within the contexts in which they are embedded (Foucault 1980).

Theoretical underpinnings

There are a number of key assumptions that shape this research. The overarching theoretical framework is poststructural. Poststructural theory is underpinned by the assumption that values and beliefs are created by discourse and they should be made explicit and available to critique. Therefore research values are brought to the fore perhaps more than in other forms of research. Poststructuralism is considered a branch of critical theory, where critical theory is a blanket term for several different perspectives such as feminist, postmodern or neo-Marxist perspectives (Guba & Lincoln 1994). Critical theories are often used to highlight how the current hegemonic discourses of society disempower particular groups.

Poststructural theory argues that people take up different subject positions at different times, based on the discourses they have access to (Davies 1993, 2004). Making the processes of subjectification visible by making discourses and their effects apparent, enables agency:

> Poststructuralism opens up the possibility of agency to the subject through the very act of making visible the discursive threads through which their experience of themselves as specific beings is woven (Davies 1993, p. 12).

This research is informed by poststructural theory, which allows the traditional divisions between disciplines such as sociology, education and psychology to be undone (Davies 1993). In this way a new theory of the discourses of climate change can be created that intersects all of these traditional disciplines. Just as different constructions of reality do not easily accept other views, the different theories within sociology, education, psychology and even agriculture do not necessarily work seamlessly together, rather they often conflict, overlap and contradict each other. As it is only through acknowledging and moving across

multiple discourses that new possibilities can emerge, this research attempts to cross multiple disciplines and draw together theories from each in a new way.

Poststructural approaches focus on language and the different ways people make meaning from language. Meaning does not exist independently within words but is attached to language through social processes (Macdonell 1986). These social processes can be considered discourses. As meanings of words differ across social contexts, poststructural research acknowledges diversity of meaning and emphasises critical thinking as a way to examine contextual consequences of different uses of language. It also advocates multiple possibilities, to increase the range of positive and equitable consequences.

Poststructural theory fits well with research examining resistance, change and discourse because it is centrally concerned with language, social structure, change and equity (Hiller 1998). Poststructural research problematises the discursive and institutional structures that limit the way people think and act. It illuminates the social forces 'at work to either enhance or limit an individual's ability to act' (Gough & Whitehouse 2003, p. 40). The links between poststructural theory and discourse analysis are explained further in Chapter Three.

Poststructural theory has its basis in subjectivism (Crotty 1998), so the interpretation presented here is necessarily subjective and partial. This research is not considered to be 'a representation of the event but part of a continuing process of knowledge production' (Pool 1991, p. 75). Therefore, in the context of this thesis, objectivity and truth claims become irrelevant and language uses, including that of this thesis, need to be critiqued for their privileges and assumptions. Attempts to make explicit for the reader the subjective processes and decisions involved in each stage of the research process demonstrate the reflexive critique and justification that have occurred during the research. It also serves to welcome further ideas and encourage a multiplicity of interpretations. Multiplicity has practical advantages because understanding the world in multiple ways opens up the languages and discourses in use to change and transformation.

Critics of poststructural theory are that it is abstract, ambiguous, lacks action, perhaps especially political action, and reduces language terms such as social and natural to representations of language devoid of tangible connections to reality (Quigley 1999). A sort of paralysis is believed to emerge from the techniques of poststructuralism which aim to 'isolate the form of rationality presented as dominant and endowed with the status of the one-and-only reason, in order to show that it is only one possible form among others' (Quigley 1999, p. 87). Within environmental studies, poststructural theory has been criticised for focusing too much on definitions of problems (Irwin 2001) rather than on generating ideas for solutions. Others argue that if people are never without discourse, there is no possibility for freedom (Litfin 1994). These critiques can be discounted because while poststructural theory argues that all knowledge is socially constructed and individually mediated, it does not deny the external existence of a physical world or the agency of humans as subjects within the world. In fact, poststructural theory aims to increase agency, through awareness and transformation of the discursive structures that would otherwise limit agency.

Poststructural theory aims to demonstrate the limitations of language on enabling complexity of thought or diversity of action. This is particularly the case in the way the English language is constructed around binary terms. Binaries are opposites such as black/white or good/bad, which attempt to classify concepts as either one or the other and resist the possibility of a range between. This means that the English language, as in other languages, is limited in effectively capturing complex, fluid ideas, which do not fit easily into binaries. Examples of such fluid concepts include, 'community' and 'environment', which are differently understood by individuals in different contexts and at different times. The tendency of the English language to position everything along an either/or binary has serious implications for how it is possible to comprehend and act on a range of issues, including climate change. Right/wrong, me/you, us/them, good/bad, human/nature, internal/external, now/later, here/there and near/far are all dualisms in relation to climate change where it is not one concept or the other but both that need to be considered simultaneously. The limitations of language

make this conceptually difficult and can lead to creations of resistance to action. Analysis of binaries using poststructural theory allows the limitations on thinking that binaries may impose to be examined, to begin to provide alternatives to overcome these limitations and to understand resistance to change.

Poststructural theory advocates multiple alternatives rather than one, true approach, and thus challenges the status quo. Furthermore, discourse analysis 'can challenge the status quo through narrating changes in the field of discourse competition over time' (Sharp & Richardson 2001, p. 198). This is because if discourses remain unrecognised they will perpetuate the status quo but with awareness of discourses, challenge and change can be enabled. In this way, discourse analysis is consistent with poststructural theory.

The recognition of multiple meanings advocated by poststructural theory enables different understandings and multiple points of action. The first step is the recognition of multiple discourses. While discourses already exist in multiplicity, they do not sit comfortably with each other and commonly conflict, suppress and dispute each other, as each strives to be an all encompassing worldview (Kress 1985). Through awareness of the range of discourses already available in society, people can increase their agency to take up different discourses at different times, or work to create new discourses as needed in order to widen the possible ways to frame problems and the consequent solutions (Davies 1993). Poststructural theory aims to bring this multiplicity to the fore and to allow people to benefit from a wider variety of understandings through a critique of discourse.

Poststructural theory is in the tradition of critical theories (Guba & Lincoln 1994). It aims to make visible the structures of discourse and enable the creation of new discourses of infinite number and possibility (Davies 2004; Kress 1985). Knowledge of poststructural theory, social constructions of reality, or discourses, may not be necessary knowledge for the average citizen or the average farmer. Nevertheless, learning about alternative possibilities of behaviour is important,

especially in relation to climate change and knowledge of these issues should be a focus for social research on climate change.

Learning theories

Behaviour change at any level requires many types of learning and learning is an essential step in creating behaviour change. This means that some level of understanding of discourse is useful for people working to facilitate behaviour change.

Learning is a complex process, which has been studied and understood in many different ways (Anstey & Bull 2004), from either side of the psychological/social spectrum and at various positions between the two. There are many different theories of learning, which are related to different beliefs about ontology, epistemology, philosophy, and so on. Within a poststructural framework, analysis of discourses in society is essential for understanding social constructions of reality. The learning theories that fit best with this research are critical theories. While there is no singular critical learning theory, they share a focus on learning for transformation and are centrally concerned with issues of power, knowledge and justice. Critical theories use language as the tool for understanding the discourses in society that perpetuate power/knowledge relations. One example is critical literacy, described in more detail below. Critical literacy can be easily aligned with theories of the environment and it has many potential links to education for sustainability. Education for sustainability is the most commonly cited education theory in relation to the environment and climate change.

Critical literacy

A sub-branch of critical theory and poststructural theory is critical literacy (Guba & Lincoln 1994). Critical literacy is a pedagogical perspective that aims to create multiple, new possibilities by making visible the way social constructs, such as discourses, work to position people and the ways they might be opened up to change (Anstey & Bull 2004; Luke 2000).

According to an on-line government statement describing critical literacy, it:

> supports the view that texts are social constructs reflecting the beliefs and values of their time and culture. Texts have multiple meanings, and readers are positioned by the structure of the discourse, by emphases and omissions, and by the point of view that represents the ideology of the implied author. As such, texts offer selected, partial versions of the world, producing, reproducing and maintaining unequal power arrangements (Tasmanian Department of Education 2007, para. 23).

Critical literacy has a strong emancipatory goal and in practice it perhaps originated with Friere (1990), who worked to empower illiterate and marginalised groups of women in Brazil in the 1960s. Critical literacy aims to open up the way social constructs work to marginalise particular people and then to develop alternatives that allow those groups more agency and force social transformation.

Critical literacy is important in relation to climate change because of arguments that society's dominant ways of life need to be re-evaluated and new ways of living found: 'climate change uniquely challenges virtually every aspect of modern lifestyles and the prevailing paradigm to consume freely… resistance to change is therefore likely to be far *greater* for climate change than for other environmental issues' (Lorenzoni et al. 2007, p. 454, emphasis in original). This becomes even more important as it is not only social human societies but also natural systems that will be subjected to large-scale change: 'Projected future climate change … is likely to require system transformations' (Nelson et al. 2007, p. 396). Opening up social processes to critique and evaluation to find better ways forward is the goal of critical learning theories and critical literacy.

Climate change will not affect the world equally. Political, social and cultural influences are all at play in climate change causes and effects. Common assumptions about power include; that humans can control their environment; that people are more valuable than nature and; that knowledge about nature must be mediated by science. These assumptions can be made explicit and interrogated by critical literacy and the corresponding ethical and moral implications extracted and critiqued. Critical literacy highlights the need to ask questions that might

normally be left unasked. In relation to climate change such questions include; what is the frame of reference and what is left out; who has power and who benefits and; what other possibilities are there? (Rowan 2001). As a theoretical perspective, critical literacy is important to inform learning processes because of competing discourses and interests that benefit some and disempower others. Climate change information already has competing discourses attached to it which need to be recognised. The possibility of linking critical literacy with agricultural extension is discussed in Chapter Two.

Why agriculture is important to consider

Agriculture is a particularly important area for research as it is on the front line of dealing with climate impacts and is of vital importance to the prosperity of Australia. Agriculture needs a better understanding of the social implications of climate change and climate change policies because 'farming is people' (Vanclay 2004, p. 213).

Agriculture is particularly susceptible to climate change with short term effects challenging seasonal crop management and longer term effects impacting heavily on land management and enterprise planning. Effects are both direct and indirect, particularly in relation to temperature and rainfall changes necessitating different on-farm management strategies while off-farm issues include changes in national and international competition, politically led mitigation requirements or regulations and other social, economic and environmental factors, such as competition for land (Garnaut 2008). Farmers as a social group are closely connected with the environment but their businesses are directly affected by restrictions limiting carbon emissions in production and transport or opportunities presented by carbon trading.

> To improve estimates of climate impacts on agriculture there is a need to know more about how farmers perceive climate and how they respond, in both the short- and long-term (Smit et al. 1996, p. 12).

Increases in global population are already beginning to put considerable demand and strain on the production and management of resources. Politics, culture and social influences are involved in the climate debate in new ways which complicate the issue more than at any time previously experienced. Climate changes that used to be solely about natural variation are now recognised as significantly anthropogenic. Since industrial times, anthropogenic causes of climate change, particularly deforestation and burning fossil fuels, have been steadily increasing and are now 'the primary source of the increased atmospheric concentration of carbon dioxide' (IPCC 2007, p. 2). Added to the fluctuating natural causes of climate change, humans' greenhouse gas emissions are creating a new global environment. Mitigating anthropogenic contributions to climate change, as well as adapting to its effects, will require new levels of social understanding, engagement and action as a range of new value and power disparities between different groups of people are created. Agriculture is vulnerable to the physical impacts of climate change and to the political and social responses to climate change (Garnaut 2008). All of these factors mean: 'There is a clear imperative for action to prepare agriculture to adapt to climate change' (Stokes & Howden 2010, p. 257).

Many projected changes in climate will significantly influence agriculture, yet resistance to action is present amongst the agricultural community (Burton & Lim 2005; Milne et al. 2008). Climate change poses a new challenge to the adaptive capacity of farmers. The extent and pace of future change will be more than they have previously experienced (Burton & Lim 2005), while efficiency gains and technological innovation are likely to be incremental and finite (Howden et al. 2008). Instances when farmers cannot, or choose not to, respond to climate change can provide a rich data source for analysis of the limitations of current climate discourses and the effects of current social constructions of climate change.

Historically, Australian farmers have continuously adapted to changes in climate and climate variability (Gunasekera et al. 2007; Stokes & Howden 2010), so

farmers might be considered to be particularly familiar with change (Burton & Lim 2005). Now, however, there is pressure on agriculture not just to adapt to the changes of climate change but also to mitigate emissions (Gunasekera et al. 2007). Farmers are a particularly interesting group to study for resistance to change because they 'can be described on one hand as highly adaptable and resilient and on the other as resistant to change' (Burton & Lim 2005, p. 196). Due to their history of adaptation to climate variability, farmers can provide particularly good insights into the discourses about climate change already present in society, how these might be creating resistance and their potential as sites for transformation. Thus, farmers offer a particularly rich site for exploring resistance and agency and the potential for discourse transformation because farmers arguably have had to respond to climate change more than any other social group. Farmers are also skilled at making behaviour changes and often do so on a regular and rapid basis:

> Historically the Australian agriculture sector has adjusted and adapted continuously to external drivers such as changes in the natural resource base, including climate variability and climate change (Gunasekera et al. 2007, p. 498).

Adaptation to climate change may be nothing new in terms of process but climate change now is different because it has a new public relevance. A new range of discourses about climate change are in the process of being constructed:

> In a new, deliberative and self-conscious way, adaptation to climate change has now become part of the contemporary discourse about the politics and economics of global climate change (Adger et al. 2009, p. 336).

Farmers' adaptation is different now because of the different social context and different social discourses that a public focus on climate change has created.

Studies of power relations and the construction of knowledge have made significant contributions to social understandings of agriculture (e.g. Carolan 2006; Michael 1992; Vanclay 2004; Wynne 1992a, 1992b). In these studies there has so far been little overt reference to discourse and discourse effects on farmers' subjectivity and agency. This is a significant gap which this thesis aims to highlight and to remedy.

Agricultural extension

Extension is to agriculture what teaching is to education. Extension is fundamentally about empowering farmers by enabling learning and change. The literature concerning agricultural extension is therefore an important connection for this research because it is involved with the processes of behaviour change in agricultural communities and shares the goals of agency and transformation.

Since the 1980s, extension has been experiencing a crisis of purpose (Vanclay & Lawrence 1995b). The crisis was largely brought about because extension was closely integrated with adoption and diffusion research (Rogers 1983). These methods of extension began to be criticised as technology transfer and as not effectively incorporating farmer contexts, needs and knowledges. Technology transfer was demonstrated to be top-down, uni-directional, patronising, irrelevant, ineffective and impractical (Vanclay & Lawrence 1995b).

Over time, extension responded by transforming to incorporate broader frames of reference, using farmer discussion groups to guide research priorities and thinking about farming systems and theories of social learning. The different evolutions of extension have used different sources of funding, across public and private sectors and had different aims and purposes. For some, this progressive change has created cynicism about which version of extension is being used and what vested interests it may serve (Black 2000; Vanclay & Lawrence 1995a). The diversity of extension definitions and of extension agents continued the debate and confusion about extension (Coutts 1995; van den Ban & Hawkins 1996). The most recent definition is now generally accepted: ‘extension is the process of enabling change in individuals, communities and industries involved in the primary industry sector and with natural resource management’ (SELN 2006, p. 2).

Recognition of the value that processes of extension could potentially provide to society is particularly important considering new challenges like climate change. Extension is organised by different groups at different times, with different audiences, places and purposes. This means that extension workers are commonly diverse in backgrounds, skills and affiliations and may work under job titles and roles that do not specify extension. They may be supported by a variety of organisations that openly advocate particular products, align with universities or industry, or specialise in other particular areas. Therefore extension crosses commercial, research and consultancy boundaries. Although extension is now becoming re-established with a recognised network through affiliated conferences, on-line support and a clearly established framework of shared aims and purposes (APEN 2009), it is still under-recognised and under-utilised as a mechanism for facilitating change (Hunt & Coutts 2009).

Prescriptive methods of extension need to be avoided, especially in relation to specific target groups or messages. It is fundamental to extension that no singular method is advocated because 'extension is not just a matter of decisions about what is the best method, but rather what is the appropriate mix of methods to best achieve a particular purpose' (SELN 2006, p. 6). This is likely to be context dependant and multiple (Black 2000) and to include awareness that even specific target groups are diverse and heterogeneous (Vanclay 2004). Connecting extension with messages of climate change further reinforces this, because reactions to climate change are often complex and varied (Moser & Dilling 2007).

Extension methods continue to be examined and critiqued, particularly in evaluations of the success or failure of behaviour change (Black 2000). A limitation of these critiques is that they are usually conducted in isolation and so difficult to draw together, as extension contexts and methods are diverse (Fulton et al. 2003). Extension methods can include group forums, media presentations or materials, field days, formal or informal education and training projects, one-to-one advice, exemplar farmers, focus farms, demonstrations, videos and

publications. Extension also includes the process of 'planning research and extension, from understanding client needs, developing a plan, appointing staff and implementing and monitoring a program, through to evaluating impact' (Fulton et al. 2003, p. vi).

This research is not critiquing the practice of extension but rather utilising the theory of extension to contribute to understandings of farmers' resistance to change because of climate change. Advances in extension theory are not always successfully implemented in practice (Vanclay & Lawrence 1995b) and extension practice is still evolving and improving. This research contributes to the theoretical development of extension by discussing the implications of language and discourse. It also contributes to the practice of extension by demonstrating some techniques for recognising discourse, namely using critical literacy and/or discourse analysis, in an agricultural context.

Extension is a discipline that could benefit from a connection with critical literacy and awareness of discourse. It is particularly well placed to examine discourse because extension works within specific social contexts. Understanding the particular discourses relevant to particular problems is empowering and creates opportunity for human agency within, movement between, or direct influence on, possibilities for the future. In many ways, this is a form of capacity building and a key objective of extension (SELN 2006).

Research methods

Farmers and advisors from two contrasting Tasmanian agricultural industries are examined to reveal their current understandings about climate change and the discourses which shape those understandings. Recorded interviews, official documents and personal observations are analysed with a constructivist grounded theory approach (Charmaz 2006) to generate codes, categories and themes. Following this, the themes are interrogated to establish if they are operating as discourses and, if so, they are analysed for power, resistance and opportunities for

action. NVivo software was utilised throughout the research process to organise and structure the process of data collection and analysis.

The primary data analysed is from 56 recorded interviews with 68 participants (some interviews included more than one person) conducted in Tasmania in 2008. These included 29 dairy farmers and 22 apple growers, 12 agricultural consultants who identified with the dairy and apple industries and 5 climate scientists asked their views on farmers' capacities for climate action. Initially, the interviews with the scientists were intended to be excluded from the final analysis because their views on climate change were assumed to be distinctly different to the other interviewees. There were no apparent differences, however, so their interviews were included in the final analysis. Some of the farm interviews involved more than one person, as both husband and wife were interviewed together, giving a total of 68 people interviewed. Ethics approval was sought and granted in 2008 from the Tasmanian Social Science Human Research Ethics Committee, number H10168.

Discourse analysis

Analysis of the discourses in the interview transcripts uses the methods advocated by Charmaz (2006) and Carabine (2001). These were used as a guide for this research because their accounts provide the most explicit examples of how to do analysis that is relevant to interrogating discourse for resistance. It is not the intent of this research to reproduce a particular methodology but rather to fashion a methodology which best answers the research question. This is in keeping with the goals of discourse analysis where one 'recipe does not exist and should not be developed' (Torfing 1999, p. 292).

While language choices are important to discuss in a discourse analysis that is informed by poststructural theory, a comprehensive linguistic exploration of language is outside the scope of this study. Therefore this research does not align with the versions of 'critical discourse analysis' (Fairclough 2001a, 2001b; Gee

2004; van Dijk 1985, 2001; Wodak & Meyer 2001) that focus more significantly on linguistics. Instead, as Morgan et al. (1996) states, all studies of discourse are necessarily critical.

Exploring resistance and discourse through a discourse analysis mean that acknowledgment of Foucault is necessary, however, discourses are regarded as being more multiple and changeable than Foucault believed (Dryzek 1997). Similarly, the relations of power that exist around climate discourses are not examined in isolation but rather the focus is on the effects of these discourses on farmers' perceptions and capacities to act to manage climate change. There are a great many interpretations of Foucault and there is no singular approach to research following Foucault, nor is one desirable: 'Foucault would, undoubtedly, have been wryly sceptical about the growth of 'Foucault studies' and the related attempt to discipline his thought and turn it into orthodoxy' (Rabinow & Rose 2003, p. vii). Here, the subjective nature of research is brought to the fore, to enable engagement with the research findings, not as a statement of truth, but as an interpretation which enables others to continue this line of thinking or be spurred on to alternate modes of thought. This is in keeping with the poststructural theory that informs this research.

Discourse analysis with a rural agricultural focus in an Australian context is unusual. While discourse analysis is increasing in popularity in the social sciences (Cameron 2001), it remains rare in agricultural science, although there are similarities to the styles of farming concept discussed by van der Ploeg (1994) in the Netherlands and Vanclay in Australia (Vanclay et al. 1998; Vanclay et al. 2006). Discourses around the environment have been explored in several different social science disciplines (see for example Carvalho 2005, 2007; Darier 1999; Dryzek 1997; Hajer 1995; Hajer & Versteeg 2005; Litfin 1994; Ungar 1992, 2000). These studies are usually undertaken through analysis of media texts or policy documents, rather than from personal interviews, although Kurz et al. (2005) is an exception. Therefore, there is still a great deal more to be discovered in the construction of agricultural power relations and discourses because the

language used by social groups in agriculture is rarely studied. This is despite the fact that: 'language matters … the way we construct, interpret, discuss and analyse environmental problems has all kinds of consequences' (Dryzek 1997, p. 9).

The analysis of resistance at the discursive level in this research aims to highlight the normalised processes of society that work to limit farmers' possible actions and thoughts. Within discourse analysis, resistance is a way of becoming aware of the ways in which particular discourses are normalised or act as normalising. Discourse analysis aims to open up spaces for re-interpretations of these normalised practices, in ways that might have completely different consequences. Resistance created at the discursive level can be explored to show how different discourses frame facts and limit farmers' available responses. Climate change is an opportunity to illuminate how discourses work within society to privilege particular social groups to act in particular ways and disempower others. Awareness of these processes then allows the possibility for the creation of new discourses of climate change with new relations of power and new actions enabled, so that new solutions to the problems of climate change can be found.

Discourses are pervasive and fundamental and analysis and reconsideration of discourse is a highly effective way of understanding change. Understanding human behaviour to facilitate social change should therefore acknowledge how discourses are at work in different situations.

Scope of this research

This research examines a group of Tasmanians associated with the dairy and apple industries. It does not aim to be representative of the whole Tasmanian dairy or apple industry nor of agricultural industries in Tasmania more broadly as a discourse analysis approach does not require representation in order to be of value (Wetherell 1998). The results are generalisable to the extent that insights may be generally useful for other industries and social groups. It is intended that the results should offer understanding of action in anticipation and response to

climate change in agriculture generally and that other socially focused studies of climate change incorporating linguistic or discourse analysis, will be encouraged.

Research context

Tasmania is an island state off the south coast of eastern Australia. It lies in the latitude 39º20'S and 43º40'S and is diverse in geography, weather and agricultural industry. The climate is influenced by the surrounding ocean and this maritime influence drives Tasmania's temperate climate.

The dairy and apple industries are both central to Tasmania's economy and identity. Both generally focus on inexpensively producing quality product for export. Yet these two industries are also different in many ways. Over the time period of this research, the apple industry faced economic difficulty, largely because of increased global competition (Hassall & Associates 2001). The dairy industry, on the other hand, enjoyed a renewed prosperity and aimed to expand production because of the high milk price in 2008. In 2009, however, after the interviews had been conducted, the global financial crisis impacted on both industries, reducing their financial security, especially in terms of international commodity prices and currency exchange rates. Labour was also a dominant issue with both industries finding it difficult to attract and retain staff, due to an ageing population and ongoing skill shortages.

The apple industry in Tasmania dates back to the mid nineteenth century (DPIW 2004b). Apples were planted to take advantage of a temperate climate, closer to that of southern England, than any other area in Australia. At the peak of Tasmanian apple production in 1960, 126,000 tonnes per annum of apples were produced, predominantly for export to the United Kingdom (DPIW 2004b). Now, especially with the entry of the UK into the European Union, the export focus has shifted to increasingly competitive markets in Asia. Tasmania currently produces, on average, in excess of 50,000 tonnes per annum (DPIW 2004b), and accounts

for 55 percent of Australian apple exports (Hassall & Associates 2001). Tasmania is referred to and marketed as the 'Apple Isle' (DPIW 2004b).

The dairy industry is one of Tasmania's most valuable agricultural industries in terms of farm gate value of production (DPIW 2004a) although in more recent years it has slipped behind seafood and meat (DPIPWE 2005, 2009). Dairying is successful because of the temperate climate and good access to water, both rainfall and irrigation, which support good pasture growth. Mild winter temperatures mean that stock are not housed over winter and are not heavily dependent on supplementary feed, minimising production costs for high quality milk. Tasmanian milk is largely exported as milk powder for use in a diverse range of products.

The two industries are likely to be differently affected by climate change and to have quite different concerns, experiences and responses to climate change. Changes in rainfall, increasing incidence or severity of drought and increasing temperatures are likely to significantly impact both industries. Climate projections suggest that Tasmania will be only mildly affected, in comparison with other regions of Australia and the world (ABARE 2007; IPCC 2007), and some agricultural industries may be comparatively advantaged by climate change. Higher average temperature may extend the season of peak pasture growth and some projections are for more rain in some parts of Tasmania (Corney et al. 2010). Therefore, Tasmanian experiences of climate change are still uncertain and how farmers make decisions and respond to information will create an important understanding of how industries are likely to be positioned into the future.

Both the apple and dairy industries have a recent history of concern about environmental problems and corresponding action. In the 1980s, the national apple industry made a commitment to reduce pesticide use by 30 percent. This was successfully achieved and many farmers regard it as an example of how effective the industry is, and can be, at responding to community concerns about

the environment (Hassall & Associates 2001). The dairy industry adopted a comparable goal of reducing the environmental consequences of effluent runoff into nearby waterways. As both industries regard themselves as environmentally responsible, in a local sense, and feel that they can implement successful actions when appropriate, research aimed at understanding attitudes to the global environmental issue of climate change is particularly relevant.

Local scale information is crucial to understanding the effects of climate change (CSIRO 2008). How farmers are able to respond will provide information that is critical for policymakers, governments, other industries and general citizens alike, as everyone will have to face the effects of climate change. Studies of peoples' concerns and responses to climate change and their adaptive capacities are essential for providing information about what can be done, what is possible and impossible, and what assistance needs to be provided, both practically and theoretically.

Understanding localised social constructions of climate change in these two Tasmanian industries is a new area of study. It will contribute to understanding climate change perceptions and management because more 'focus on the human, the cultural and the relational, on the significance of context and of place' is needed (Grove-White 1996, p. 284). This research provides such a local, social account of how climate change is currently understood and being acted upon as well as how learning and action might be better facilitated in Tasmania and more broadly.

Constructed knowledge

The discourses generated in this data collection are the product of a particular discursive context, including the situations of both the interviewee and the researcher. These discourses intrinsically affect all stages of the research, from the selection of topic and collection of data to the chosen methods of analysis and the results and recommendations produced. Reflection on the research context

confirms that the research data is not produced by an 'independent neutral observer documenting a reality cleverly captured, but an attempt to be reflexive about the dynamics that occurred in producing the findings' (Pini 2004, p. 176). In order to be as transparent as possible about the research, the method is described in detail at each stage of the analysis rather than using a more conventional description of the methods separate from the data.

During the interviews there were different discourses affecting the responses of different interviewees, including discourses of drought, financial difficulty and concern about an impending government carbon emissions trading scheme. These are recognised as all interacting to produce the particular set of interview responses analysed here.

Brief summary of findings

The interview responses ranged widely and the diversity within groups was remarkably similar. There were no apparent differences between dairy farmers, apple growers, agricultural consultants and climate scientists. This was unexpected, as the project was originally conceived as a comparative study between the dairy and apple industries and it was expected that the interviews with climate scientists would be excluded. As there was nothing to set any particular group apart, however, all of the interviews were included in the final analysis.

There are many reasons for resistance identified by the interviewees. The majority of farmers quote the uncertainty, controversy and complexity of climate change as a significant reason for non-action. Very few are wholly convinced about the anthropogenic causes of climate change and therefore the need to change practices. Despite this view, they are concerned about the political pressure that will be imposed on them and the likely consumer demands and/or reactions that will occur if a carbon trading scheme is introduced.

In the community interviewed, four discourses around climate change were developed which were named: Money, Human Responsibility, The Earth and Questioning. Each of these discourses creates resistance to action on climate change in particular ways and also provides avenues of opportunity for action. Awareness of these discourses provides useful, practical insights into overcoming resistance to action, particularly in terms of which ideas to promote and which to avoid, as well as which language to use in contexts where similar discourses are circulating.

There was no difference in the prevalence of any discourse found in any group and all four discourses were present in all. This may mean that the four discourses are potentially more generally applicable than otherwise might be expected from this type of contextual research, especially as the discourses found support other myths and discourses described in the literature (Douglas 1992; Hulme 2009).

Each of the discourses overlaps with others and each is complex. There is no simple link between particular beliefs in climate change with any one discourse. Each discourse encompasses a range of views about whether climate change is anthropogenic or not and whether it is able to be influenced by actions now and into the future. The discourses are organised by their central motivating worldview and discussed in more detail in Chapter Five.

Overview of implications for extension and policy

This research addresses the need to increase understanding of likely farmer and community responses to climate change by taking a discourse analysis approach:

> The dominant discourses surrounding the politics of climate change play a critical role in privileging particular actors, problem definitions, and solutions in the policy process. While such a conclusion appears obvious and unremarkable, much of the scholarship on climate change does not take seriously the ways in which underlying discourses and norms dictate the framing of the problem and the potential solutions (Pettenger 2007, p. 236).

Providing a unique and essential understanding of how two particular industries are responding to climate change, why this is so and what practices and actions need to be put in place to enable other responses, addresses the need for more climate change research to help 'translate intention into action' (Chess & Johnson 2007, p. 228). Lessons for other industries, policymakers, extension agents and citizens facing climate change are discussed where possible and may have both theoretical and practical applications.

> There is a need for deeper social changes and 'advancing our understanding of resistance and barriers to climate action' (Moser & Dilling 2007, p. 512).

The reasons farmers resist taking up these actions, presents an opportunity to uncover alternatives to the dominant discourses. The current discourses of climate change that farmers exhibit are not likely to be sufficiently recognised, nor are they likely to allow farmers effective or equitable agency. There is a need to critically examine the possibilities for subjectivity and agency created by current discourses in order to find ways to empower farmers.

For extension, knowledge of the discourses operating in particular social groups is useful for understanding concerns and is beneficial when communicating with farmers and trying to achieve behavior change. The discourses discussed in Chapter Five have different implications for communication in relation to techniques likely to be successful to promote action and those which are less likely to succeed.

At a policy level, communication that clarifies the changes that can and are being made on farms and public rewards for change is recommended. More opportunity for farmers to work together, to discuss and learn from each other should be supported, especially at the community and extension level. In talking together, there is more opportunity for new discourses to emerge (Bowman 2009). The applications of discourse to extension and policy and the implications of the discourses in practice are further discussed in Chapter Six.

Climate change is a complex and uncertain phenomenon for many in the agricultural community because of experiences with past climate change and climate variability. Therefore, more social and contextual understandings are required in order to respond to particular community needs. Advocating individual farmers to act without responding to the discourses in which they are embedded is likely to prove ineffectual, as resistance is created at the level of discourse and is not inherent in individuals. Discourses need to be studied at the social level and should also be embraced as an opportunity for the creation of new, transformative discourses.

Conclusion

Arguably, resistance to change is created by discourses. With an awareness of how discourse works it is possible to identify where resistances are created by conflict and where there are possibilities for agency and to create change. Discourses affect people unconsciously but with analysis they can be made explicit and used to advantage. The reasons behind people's resistances are a signal of a discourse limiting or making certain actions difficult because they are restricted by power, culture and agency.

The discourses and the sites of resistance around climate change are likely to be different for different social groups. Reconceptualising resistance as socially constructed, context contingent and a site of opportunity for agency and transformation means that change can be better facilitated, by examining the diversity of responses within particular groups. This is not to replace the dominant discourse with a new one but to allow multiple discourses, create more options and new possibilities.

A more social focus, particularly on language and discourse, is needed for research on climate change and agriculture. Multiple and diverse understandings of climate change must be recognised and developed in different contexts to increase farmers' possibilities for climate change action.

The contribution of this thesis to understandings of behaviour is to connect the theories of discourse with social research in agriculture and to demonstrate the key discourses present in two agricultural community's understandings of climate change. This provides more local scale information and contributes to a social understanding of resistance in order to enable a broader range of action to prepare for, and to mitigate, climate change. Knowledge of how discourse affects thinking and behaviour and how a local community currently understands climate change is an important contribution for those interested in assisting farmers.

CHAPTER 2

Readings for resistance: climate change in a social context

Until now, there has been little use of poststructural theory to examine the discourses of farmers. In poststructural theory, discourses are an essential part of understanding the subjectivity of individuals and possibilities for resistance and agency. Poststructural theory argues that it is necessary to focus on social issues and social concerns in order to understand individual behaviour (Kress 1985).

Applying poststructural theory and theories of discourse to a critical reading of the established literature on community responses to climate change, illustrates how current discourses may be limiting farmers' possibilities for agency and creating resistance. Literature from a range of disciplines including sociology, education, psychology, science communication, public understanding of science, philosophy and agricultural extension is reviewed to construct three different discourses. It is likely that these discourses, developed from the literature, are applicable in wider society. The effects are then critiqued in a farming context to demonstrate the possibilities for change that awareness of these can create. It is suggested that a similar process can be achieved in other areas using the methods advocated by critical literacy.

There is no singular discourse of climate change that is likely to be adequate to allow farmers a better range of possibilities for action. Instead, following poststructural theory, multiple new discourses need to be created. A critique of the discourses from the literature demonstrates how these might be transformed as well as highlighting points where completely new discourses can emerge. To

begin this process, new discourses of climate change are produced from the analysis of interviews undertaken in this research, outlined in later chapters.

Discussion of discourses within the social sciences, particularly in relation to climate change, is a relatively new field of study. Terms such as: literary repertoires and narratives (Hulme 2009), relational milieux (Potter & Oster 2008), social norms (Griskevicius et al. 2008), habits of thought (Bateson 2007), internal and external forces (Tribbia 2007), cultural forms (Douglas 1992), cultural cognition (Kahan et al. in press), ecologies (Halpern et al. 2004) and theological worldviews (Curry 2008) might also be read as discourse. Other studies have been carried out with more overt reference to discourse (Darier 1999; Dryzek 1997; Litfin 1994) and increasingly these are beginning to focus on climate change (Carolan 2006; Ereaut & Segnit 2006, 2007; Hajer 1995; Hulme 2008; Pettenger 2007; Risby 2008; Ungar 1992, 2000; Weingart et al. 2000). Nevertheless, as discussed in Chapter One, as yet there has been little accounting for discourses in agriculture, especially within Australia, with only limited studies identified (O'Kane et al. 2008; Palmer 1997). Although Vanclay's discussion of scripts and farming styles (Vanclay et al. 1998, 2006, 2007) can be considered as implicitly recognising discourse.

Although not discussed in the literature as a solution to agricultural extension problems like climate change, critical literacy could contribute to facilitating climate change action. Critical literacy strategies allow the effects of discourses to be made visible. Critical literacy and extension share similar goals and therefore could easily be aligned, although there are differences to be acknowledged.

Chapter overview

There are many different discourses of climate change circulating in society and many are unrecognised. Three such discourses of climate change are identified in this chapter. These are apparent in the various literatures intending to provide

scientific information on climate change, yet they have not been acknowledged previously. As a result, some key understandings of why farmers might resist action because of climate change have not yet been made. Reasons for resistance to action to address climate change are discussed under three headings; the discourse of logical action, the discourse of complexity and the discourse of culture. The review focuses specifically on the reasons for farmers' resistance to action promoted by each discourse, although as will become clear, because of the context of these discourses, farmers are not always included. The need for the inclusion of more of farmers' discourses is one of the main arguments of this research.

This chapter argues that the three discourses named here each demonstrates particular values and actions and constructs farmers' resistance to changing behaviour differently. Each discourse positions farmers to understand and act on climate change in different ways. The explanations as to why farmers might resist climate change action created by these three discourses from the literature are also interrogated. This discussion offers a new clarity of farmers' current possible positioning for action on climate change.

Following discussion of the three discourses, different ways to address climate change, such as ecological modernization from economics and education for sustainability (EFS) from education, are described. From a poststructural perspective, it becomes apparent that, like the three discourses described in this chapter, these accounts strive to be all-encompassing views of climate change, promoting particular values and constructing resistance in particular ways. An examination of these reveals their particular influence on the available subject positions of farmers and their limitations for farmers' agency.

Genealogy of climate change discourses

Knowledge of climate change is currently experiencing an explosion of information, texts and discourses. This is because, for climate change, 'the

quantity of specialised information is exploding' (Ungar 2000, p. 308). The diversity and sheer volume of information as well as the amount of discussion and debate means that there are different understandings of climate change:

> those holding different value perspectives may see in the huge and diverse body of scientific information relevant to climate change different facts, theories, and hypothesis relevant to and consistent with their own normative frameworks (Sarewitz 2004, p. 389).

The different understandings of climate change created by an explosion of climate texts creates new power relationships, new conflicts and struggles of meaning and new social effects. That is, they create new discourses with new uses of language and outcomes, 'power's hold … is maintained through language, or rather through the act of discourse that creates' (Foucault 1979, p 83). Therefore, climate change is a special opportunity to illuminate how discourses work within society to create particular effects. Better awareness of these processes will allow new forms of climate change action to be found from new discourses creating new possibilities for agency.

Different discourses create resistance to action in different ways. Where these different discourses conflict or overlap, presents an opportunity to recognise the effects of discourse and to create change which better includes and empowers farmers.

Climate change is understood differently in different contexts, based on a history of developing ideas about people and the environment. Whether climate change is perceived as certain or uncertain, natural or anthropogenic, actionable or not, will change depending on which discourse occurs in which context (Pettenger 2007). Resistance to climate change action is best demonstrated through existing discourses because an examination of discourses exposes their social context and historical development.

An examination of the historical development of discourses, which Foucault (1971) terms 'genealogy', shows how historical influences have combined to develop into the discourses prevalent today. All discourses have a history and are

influenced over time from various sources. As Foucault (1971) describes, genealogy charts this history of discourses, not in terms of a singular truth or a linear development from a point of origin until now, rather genealogy demonstrates the influences of different discourses at different times and how discourses change over time. In the present context for example, the genealogy of discourses of farmers might include experiences of climate variability and perceptions of nature, the environment and sustainability. Sustainability and perceptions of the environment are issues that are commonly explored in the sociological literature, especially in narrative accounts of how people respond to their environment.

In the academic literature, three scholars make comments pertinent to how the current discourses of an agricultural community might have developed. These are Douglas (1992), Dryzek (1997) and Hulme (2009). Douglas (1992) discusses four different cultural perspectives that influence how people view the world. While they have been variously named over time, in their most recent description they are labelled hierarchy, individualism, egalitarianism and fatalism (Verweij et al. 2006). Each of these relates to a particular myth of nature which Douglas (1992) draws from the work of Holling (1986) and Thompson (1983).

Myths are stories that capture familiar assumptions about reality (Hulme 2009). The four myths describe nature as 'capricious; as robust; as robust within limits; or as fragile' (Douglas 1992, p. 262). Each myth of nature connects with a different cultural perspective: 'The myth of nature comes as part of the package that they have chosen when they opted for a cultural form' (Douglas 1992, p. 264). The capricious view of nature is that nature is unpredictable and uncontrollable. This view aligns with Verweij et al.'s (2006) fatalistic cultural typology. The robust view is that nature is infinite and unaffected by humans and matches with the individualistic cultural pattern. The robust within limits view of nature is as a finite resource that is manageable by humans and suits the hierarchical perspective. Finally, the view of nature as fragile and in danger because of humans accords with the egalitarian typology (Verweij et al. 2006).

Each of Douglas' (1992) views of nature relates to broader perspectives about how the world is, what is of value and what are proper 'ways of life' (Verweij et al. 2006, p. 819). They have become pervasive influences in environmental disciplines and have also recently influenced thinking about climate change (Hulme 2009; Verweij et al. 2006). If there is a commonality between the discourses presented as the findings of this research in Chapter Five and Douglas' (1992) work, then these myths are likely to have contributed to the genealogy of the discourses of the agricultural community interviewed.

Dryzek (1997) wrote about four environmental discourses and focused on their political connections. The discourses are: survivalism, sustainability, problem-solving and green radicalism. In a brief summary, the survivalism discourse concerns issues with limits to growth; sustainability concerns the possibility that economics and environmentalism can co-exist harmoniously; problem-solving concerns current governmental structures overcoming environmental problems; and green radicalism concerns changing society to privilege the environment. There are points of overlap between Douglas' (1992) cultural patterns and the environment discourses, but Dryzek (1997) discusses issues including language use, who the discourses privilege, their effects on institutions and politics and what is absent from each discourse. Dryzek (1997, p. 197) states that, 'different discourses may be applicable to different kinds of problems', so it would not be expected that these discourses of the environment would be replicated in farmers' discourses of climate change. As with any similarities with Douglas' (1992) work, the extent to which these discourses may have similarities with the climate discourses in this research can be considered as reflective of the genealogy of climate change discourses.

Most recently of the three, Hulme (2009, p. xxvii) cites 'four contemporary and contrasting ways of narrating the significance of climate change'. The discourses described are: climate change as a battleground, as justification for the commodification of the atmosphere, as inspiration for reinvigorated social

movements and as a threat to global security (Hulme 2009). Four narrative myths of climate change that are 'rooted in human instincts for nostalgia, pride, fear and justice' (Hulme 2009, p. 341), are also detailed. Hulme's (2009) identification of four discourses and four myths of climate change provide a wider social context for the genealogy of farmers' discourses because his work is drawn broadly from society and not from any one specific social group.

How climate change is perceived changes in different social settings (Pettenger 2007), because of the influence of different dominant discourses. How the climate discourses in this research may support or conflict with the work of Douglas (1992), Dryzek (1997) and Hulme (2009), will be explored in later chapters.

Discourses and resistance

Discourses have not been a research focus within agriculture, but studies of resistance to pro-environmental values and behaviours has been prevalent across many disciplines since at least the 1960s. Environmental education, education for sustainability and agricultural extension are examples that aim to understand and enhance pro-environmental behaviour and in so doing, they deal with resistance to change. Climate change studies are now becoming more prevalent and research focusing on resistance to pro-environmental values and behaviour change are starting to emerge (e.g. Lorenzoni et al. 2007; Moser & Dilling 2007; Stoll-Kleeman et al. 2001).

In a study of Australian farmers' motivation and adaptive capacity to respond to climate change, Milne et al. (2008) found that resistance to climate change actions are apparent in Australian agricultural communities. A lack of clear information, uncertainty about the difference between drought and climate change, a wide range of views on the causes of climate change and the hope that environmental changes are all part of a natural cycle, were found to be factors which inhibit farmers' motivation and capacity to act (Milne et al. 2008). More

than 50 percent of those involved in their study indicated that they were not taking any action in response to climate change.

Apart from Milne et al. (2008), there are limited accounts of how agricultural communities are responding to climate change. This is despite widespread acknowledgement of the significant contributions of, and impacts on, agriculture (ABARE 2007; CSIRO 2008; Garnaut 2008; Gunasekera et al. 2007). Few formal studies of how agriculture is responding means that understanding of the social reasons for resistance to change (Vanclay 1992, 2004) have so far not been utilised in relation to climate change.

In order to collate the issues affecting farmers' capacities to act that are presented on climate change, three discourses were constructed from a critical reading of the literature. These discourses are named logical action, complexity, and culture and are not exclusive of each other.

The discourse of logical action

One dominant discourse of climate change that can be constructed from a critical reading of the literature about behaviour on climate change, identifies the need for more information, or better understanding of information, as the most significant barrier to otherwise logical action for change. A typical example of this discourse is found in the excerpt below from the Tasmanian Framework for Action on Climate Change:

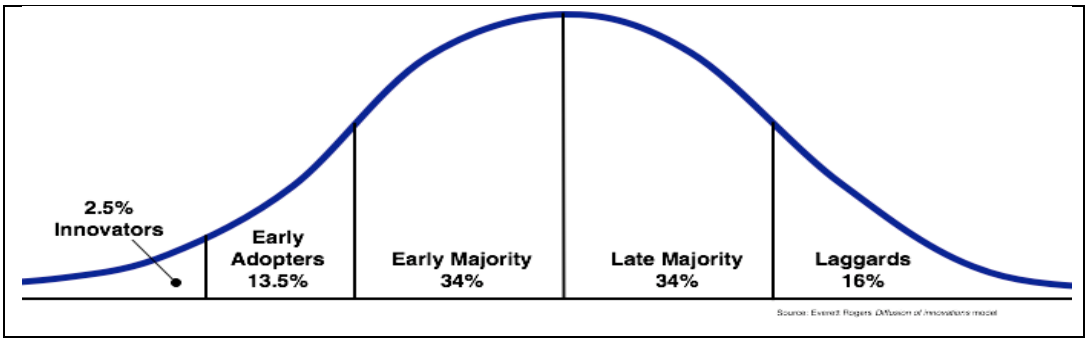
> In many cases, the biggest barrier to people starting or taking further action on climate change is a lack of information. If we are to engage everyone in our communities effectively, and empower them to take action, then we must provide information that helps them understand how climate change will impact on the places in which they live and work, and what they can do to adjust (Tasmanian Climate Change Office 2008, p. 13).

Agriculture has debated barriers to change in other contexts since Rogers' Diffusion of Innovation Model in 1962 (Guerin & Guerin 1994; Marsh & Pannell

2000; Pannell et al. 2006; Vanclay 1992, 2004; Vanclay & Lawrence 1995a). Nonetheless, the notion of a barrier associated with insufficient or inadequate information is still considered a significant obstacle for behaviour change:

> the lack of definitive and clear information on climate change is an immediate obstacle for farm and small businesses to developing management strategies for dealing with risks associated with climate change (Milne et al. 2008, p. 91).

Figure 1: The 'Diffusion of Innovations Model' (reproduced from Rogers 1962, p. 247).



In agriculture, Rogers' Diffusion of Innovations Model (1962), which describes the rate of farmers' behaviour change along a normal curve, has informed a great deal of research into resistance and change (Vanclay et al. 2009). It has been criticised, however, for portraying a rational, linear process of behaviour change and for promoting universal types of farmers who either take up the logical option of change or resist it (Vanclay & Lawrence 1995a). Although it is now some 48 years since publication, it is still common for this model to inform many policy makers' understandings of farmers' behaviour change (Cary et al. 2002) and theories of change more generally (Birney et al. 2006).

Climate change presents an urgent reason for farmers to change in the eyes of many (Garnaut 2008) and the Diffusion of Innovations Model (Rogers 1962) presents a way to understand behaviour change that is particularly attractive to policymakers (Cary et al. 2002). Nevertheless, the model has similarities to the much criticised information deficit model (see Potter & Oster 2008), as both assume a direct link between information and change. Sociology has refuted this assumption for decades yet, in the climate change literature, assumptions that

information is the most important obstacle in the way of otherwise logical action still form a dominant discourse (see Moser & Dilling 2007; Potter & Oster 2008).

Persuasion and capacity

Related to the discourse of logical action are two key issues of persuasion and capacity. These reflect a core assumption of the discourse of logical action, that action is the logical outcome of the provision of information. Persuasion regards the way in which information is presented as being the critical factor to produce change. For example:

> Information is necessary, but not likely to be sufficient, to bring about change. What is critical, however, is the way that information is conveyed to different stakeholder groups (Milne et al. 2008, p. 107).

Persuasion emphasises the need for credible messengers (Cole & Watrous 2007), and appealing and manageable pieces of information (McKenzie-Mohr & Smith 1999).

Capacity regards the situation of individual farmers as the critical element resulting in change. Capacity refers to requirements of change such as available time, money, infrastructure, technology, as well as convenience, ease, flexibility, divisibility, motivation, risk, resources, support, individual character traits and skills (McKenzie-Mohr & Smith 1999; Moser & Dilling 2007; Vanclay 2004). Divisibility refers to the breakdown of a change in behaviour into the required steps and how achievable these may, or may not, be as actions on their own (McKenzie-Mohr & Smith 1999; Vanclay 1992).

Capacity regards behaviour change as difficult and as requiring a number of different steps, of which provision of information is the first and most important. Multiple steps involved in the process of change means that change can fail at multiple stages (McKenzie-Mohr & Smith 1999). Therefore, resistance to change is created by a failure of one of the steps and these may range from available time to sufficient individual skill. Sourcing information and having the skills to apply

information to personal contexts are problems of capacity. Both persuasion and capacity rely on the assumption central to the discourse of logical action, that change is logical. The relationship between knowledge of change and action is directly linked (Potter & Oster 2008) and information will result in behaviour change provided information is persuasive and physically actionable.

Farmer subject positions: laggards lacking resources

The discourse of logical action creates a subject position for farmers as resistant because they are slow to accept change. In the Diffusion of Innovations Model (Rogers 1962) this position is given the term 'laggard' (see Figure 1) and often associated with a lack of resources. In the discourse of logical action, farmers' resistance to change is seen to be the result of an individual having insufficient information, understanding of available information or physical capacity to act. Farmer resistance to change is caused by problems of information access, comprehension or capacity and related to individual levels of education, personal skill or income.

In the discourse of logical action, farmers are positioned as passive recipients of information. This point is contested by some, however, as from the farmers' perspective resistance is created because of rejection of the subject position of laggard (Wynne 1989). The discourse of logical action creates farmer subject positions that should respond to expert information with immediate change, regardless of the many personal factors that influence farmers' decisions to change (Vanclay 1992, 2004).

> There is a need to recognise that farmers adopt new ideas, not because those ideas have been transferred and disseminated or diffused, but because they are of value, in one form or another (Vanclay & Lawrence 1995a, p. 170).

In the discourse of logical action, farmers are seen as needing to be persuaded by specially targeted information. Farmers are understood to be heterogeneous and it is accepted that there is no single type of information which would encourage all farmers to change behaviour. Instead it is necessary to tailor different information

to different farmers. Ideally, information should be communicated from an accepted and familiar source and it should be clearly relevant and easily applied (Land & Water Australia 2006). Therefore, in this discourse, skilled communicators are required to translate information to farmers and farmer resistance is regarded as a result of a failure of information being received. Externally produced and communicated information is essential to change farmers' behaviour and farmers are not recognised as being capable of producing their own reasons or methods for change, without external facilitation and direction.

In the discourse of logical action, if farmers resist change after having understood and accepted information, it is because they lack the necessary resources to change. These resources might include the right type of information, sufficient funding or specific individual skills. Thus, farmers need support to access resources. This support ranges from learning new ways to evaluate information more critically and reflectively (Armitage et al. 2008), new methods of learning (Birney et al. 2006) and revitalised extension programs (SELN 2006). The skills that farmers already have in understanding the ways climate affects their farms and developing innovations for changing their practices are not regarded as sufficient. Instead, the need for farmers to develop new skills and the need for people to be trained to deliver these skills to farmers are presented as essential in this discourse.

The discourse of logical action privileges behaviour change at the level of the individual and assumes cause and effect correlations between knowledge and behaviour. It aligns with models of behaviour that privilege the individuals' ability to act and ignore the different power of institutions, social networks, cultures and language. Therefore, frustration and resistance is created because of the slowness of facilitating change at the individual level (Tribbia 2007).

As Sturgis and Allum (2004) state, information is an important element of behaviour change, yet it can also be argued that social and cultural factors of

discourse are more important in shaping, constraining and creating behaviour (Potter & Oster 2008). The considerations that shape behaviour are complex and interrelated and are not properly acknowledged by the discourse of logical action. Examining individual characteristics of people or behaviours or the quality of information, without connection to wider social, political, cultural and historical constructions of discourse, is not an adequate way to understand behaviour or to create change. To understand behaviour and the processes of behaviour change, social contexts and social concerns must be a central focus.

The discourse of complexity

Another dominant discourse in the literature on climate change emphasises the complexity of climate change in all aspects, not least of which is communication: 'Communication about climate change is as complex as the science' (Chess & Johnson 2007, p. 223). In the discourse of complexity, which is evident in some of the climate change literature, climate change is promoted as especially complex because climate research, the dissemination and comprehension of information and effective communication and implementation of behaviour change each represent 'wicked problems' (Rittel & Webber 1984). Problems termed 'wicked' are those which are especially interrelated and complex. This complexity means that actions intended to address climate change can appear especially difficult, overwhelming or pointless (Moser & Dilling 2007).

> Climate change is a very complex, pervasive and uncertain phenomenon, generally difficult for people to conceptualise and to relate to their daily activities, arguably because it cannot be easily translated into the language of popular culture (Lorenzoni 2006, p. 74).

The literature that produces the discourse of complexity presents climate change as a specialised science created by multiple interactions between the oceans, land masses and the atmosphere. In this discourse, the diverse and interrelated effects of climate on the environment, including but not limited to the weather, are emphasised. Furthermore, these effects occur over long time scales of years, decades and centuries, so cause and effect connections are difficult to establish

and cycles are not often experienced by individuals and/or not accurately remembered (Moser & Dilling 2007). Therefore, in the discourse of complexity it is assumed that resistance to action is created because climate is perceived as distant, abstract, vast and unalterable (Moser & Dilling 2004).

In the discourse of complexity there is a tendency to list and detail the multiple areas of complexity involved with climate change. This indicates that climate change is indeed complex, however, it also creates the assumption that complexity can be managed if issues are simplified and resolved separately. This assumption is based on the tradition of the scientific method described as 'black boxing' (Jasanoff 2006, p. 35), meaning that issues can be separated, defined and limited (Moser & Dilling 2007). Promoting the complexity of climate change in this way can create pessimism and resistance to action because of the vast list of individual problems to address. Therefore, dealing with the overall issue presents the gargantuan task of dealing with a multitude of individual problems. Attempting to separate climate change in order to try and manage it is therefore seen as overwhelming, and it becomes the main reason for producing resistance to act (Moser & Dilling 2004).

Uncertainty and misunderstanding

Related to the discourse of complexity are two key issues which increase complexity and promote resistance. These are uncertainty and misunderstanding. An example of uncertainty increasing the level of complexity of climate change is:

> There will always be uncertainty about future climate change impacts due to highly uncertain levels of future greenhouse emissions; fundamental uncertainty in the science of the global climate system; uncertainty about how specific changes in climate will affect agricultural/ ecological /social systems, and uncertainty in how communities will respond to these changes (CSIRO 2008, p. 1).

In the literature on climate change, many papers, books and journal articles use language that associates uncertainty with climate change and the complexity of

interpreting climate data. In most cases the uncertainty is integral to climate science and relates more to the notion of statistical probability than to scientific validity. Nevertheless, perceived uncertainty emphasises a complexity which is promoted, particularly by the media, in order to create controversy and debate and to generate a market for news (Carvalho 2007).

Emphasis on uncertainty and the need for more science to create more knowledge commonly occurs within the discourse of complexity. Resistance to action comes from perceptions of confusion about the science of climate change and the need to wait for clearer information.

> Troubles in translating this consensus in climate science have led to the appearance of amplified uncertainty and debate, also then permeating public and policy discourse (Boykoff 2008, p. 1).

Thus, in the discourse of complexity, uncertainty is emphasised as a normal part of the production of science, however, uncertainty is not properly understood by other audiences (Hulme 2009) and therefore uncertainty is seen to be a likely cause of farmers' resistance to action in response to climate change.

With confusion comes misunderstanding, a related key issue in the discourse of complexity. Public understanding of science is an area of literature that is particularly focused on public misunderstandings (e.g. Bord et al. 2000; Bostrom & Lashof 2007; Leiserowitz 2007; Stamm et al. 2000). In the public understanding of science literature, specific examples of the misunderstanding of complex climate issues are: confusion about the difference between the concepts of the hole in the ozone layer and climate change; weather and climate; climate change and environmental pollution and adaptation and mitigation.

In some situations, conflation of the ozone layer and climate change can aid comprehension of the global nature of climate change and the role of gases in the atmosphere. In the public understanding of science literature, however, linking the concept of the recovery of the upper atmosphere ozone depletion with climate change creates a false optimism that climate change can be easily addressed (Leiserowitz 2007). In this way, misunderstanding the complexity of climate

change causes resistance because people misunderstand the scale or the impact it will have on them personally and do not see a need to change their own behaviour (Chess & Johnson 2007; Leiserowitz 2007).

Similarly, conflation of pollution and climate change is also a misunderstanding of complexity that is seen to create resistance. Mistaking pollution for climate change can mean that people focus their efforts on behaviours that are largely ineffectual on climate change, such as recycling domestic rubbish rather than reducing consumption (Princen et al. 2002).

The literature that produces the discourse of complexity emphasises the need to separate all of the issues involved in climate change and clearly understand each one. It promotes the view that every aspect of confusion about climate change is another reason creating resistance to act. For example, the name change from the Emissions Trading Scheme to the Carbon Pollution Reduction Scheme (Department of Climate Change 2008) arguably caused confusion and subsequently resistance.

The use of global warming as a synonym for climate change is another example of language potentially contributing to misunderstanding. As this discourse regards accuracy of meaning to be crucial for correct understanding, the use of different synonyms is problematic. The discourse regards neither term as satisfactory, however, because global warming simplifies the problems of climate change to only temperature increase, likely to be misconstrued as positive, while climate change is equally misunderstood and appears passive, benign and distant (Potter 2005). The failure to have clear definitions of terms and shared understandings of key concepts are issues in the discourse of complexity that are believed to create resistance to action.

In the particular context of the farming community, conflation of weather and climate, or climate variability and climate change, exemplifies how a confusion of terms contributes to the discourse of complexity. This is a concern because

inaccurate understandings of the difference are seen to create resistance to action (Bostrom & Lashof 2007). Confusion of weather and climate may create the view that changes are normal cycles. The day to day changeability of the weather can lead to a perception that it is outside human influence or control, therefore climate change is more likely to be viewed as part of a natural cycle, or rejected as not occurring at all. The misunderstanding of the impacts of climate on weather is cited by the literature in this discourse as a cause of resistance to action.

Conflation of drought with climate change is another specific issue relevant to understanding resistance in the farming context. In the discourse of complexity, proper understanding of drought and climate change as separate issues that interact is believed to be essential for being properly positioned to act.

A final example of a misunderstanding causing resistance is the insistence on the separate meanings of the terms adaptation and mitigation. Conflation of mitigation and adaptation is regarded by the literature that produces this discourse to confuse the level of risk that climate change poses. While many farmers may be confident in their ability to adapt to changes in the environment, the extent and pace of future change because of climate change may be more than they have previously experienced and mitigation will also be required. In this discourse, adaptation is not recognised as relating to mitigation and as farmers feel confident relying on adaptation, they are seen to be misunderstanding the complexity of climate change and resisting changing their behaviour to include mitigation. In this discourse, farmers are seen to require education on the differences between each of the above aspects causing confusion, if they are to act to address climate change.

Farmer subject positions: ignorant and sceptic

The discourse of complexity presents climate change as largely incomprehensible to people without specific training and therefore almost impossible to adequately

communicate in order to create behaviour change. The discourse of complexity demonstrates an assumption similar to the earlier discussion of logical action where information is the only factor in promoting change. In both discourses an inability to understand information is the fault of limitations of individual people.

Farmers positioned within the discourse of complexity are constructed as ignorant and as insufficiently skilled to comprehend the levels of complexity of climate change information without significant assistance. The above issues of conflation of drought and climate change, climate variability and climate change, or weather and climate, are seen as explanations for farmers' resistance to action and as being caused by farmers' ignorance (Bord et al. 2000; Leiserowitz 2007; Potter & Oster 2008). Farmers assumed to be ignorant of the proper facts about climate change are expected to come to conclusions that do not reflect the proper complexity of climate change. This in turn can lead to farmers taking actions that are irrelevant to influencing climate change. In a similar way to the discourse of logical action, resistance is created because farmers' knowledge is not valued or included (Carolan 2006; Wynne 1992a). Farmers are not perceived as able to relate scientific knowledge to their own situations in ways that might be legitimate, valuable or important, and because they cannot work with information to adapt or change it, resistance is created because information is too complex (Moser & Dilling 2007; Potter & Oster 2008).

In the discourse of complexity, the complexity of climate change is regarded as a problem to be overcome (Potter & Oster 2008). The most appropriate solution is therefore to increase the amount of information and communication about climate change, which works to perpetuate uncertainty and misunderstandings (Ungar 2000) and thereby increases the power of the complexity discourse.

In the discourse of complexity, farmers who resist action to address climate change are described as sceptics because they fail to accept the presented justifications for change. The use of the term sceptic also overlaps with the previously described discourse of logical action because farmers are perceived as

being uneducated and slow to change. Scepticism in science is usually highly regarded as a characteristic of objectivity and of the process of stimulating debate, rigour and engagement with information. In the discourse of complexity, however, farmers are not authorised participants in science and therefore not given the authority to participate in the validation of climate information. This means that if farmers are sceptical it is the result of a social failure, if the media has failed to adequately communicate information from science, or an individual failure, if the farmer has failed to adequately comprehend or act on information. As Wynne (1992a) argues, farmers are likely to resist this imposed subject position because science, the media and government are seen as promoting their own values and power and therefore are not to be trusted. The clash between science, the media and farmers creates different perceptions of the same information because 'forms of filtering and reinterpreting information about climate change are rooted in, and reproduce, profoundly divergent value systems' (Carvalho 2007, p. 239).

Issues are understood differently across different discourses and the same problem can both stimulate action in one discourse and inhibit it in another. People construct meanings of climate change in their own terms (Bulkeley 2000) and the meaning of unfamiliar terms is related to the discourses that people are already embedded in. Whether the meaning that is constructed results in resistance to action or opportunity to act is related to how individual subjectivity and agency is able to be constructed within different discourses.

The discourse of culture

A third dominant discourse in the literature on climate change emphasises that climate change is interlinked with current social attitudes about lifestyles, consumption habits and environmental values. In this discourse, climate change is a problem of western culture. Climate change is 'closely linked with current lifestyles' (Tjernstroem & Tietenberg 2008, p. 315).

Climate change is perceived as being related to culture and only able to be addressed by changing culture:

> Ultimately, the greatest potential for a shift towards sustainable lifestyles might be through a change in culture – that is, a shift in assumptions about human nature, our relationship with the world around us, the nature of human society, and our aspirations for the Good Life (Michaelis 2007, p. 258).

In the discourse of culture, resistance to change is created because of the power of current cultural ideals that are so entrenched they require a significant event, such as a major natural disaster, to catalyse a re-evaluation of culture. Without such a catalyst, society will continue to ignore serious environmental problems in blind pursuit of capitalism: 'We have created a society that is totally geared toward generating wealth and satisfaction' (Röling 2003, p. 77).

The discourse of culture gives several examples of cultural reasons for resistance to changing behaviour because of climate change, including food, lifestyle choices and travel, all generally relating to consumerism. Consumerism and its associated implications for what makes a good life by western standards can create resistance to addressing climate change, because of the values of competition, capitalism and globalisation that are promoted and increasingly accepted in society. Western culture is built on a foundation of capitalism where success is equated with wealth and power relative to others (Clover & Hill 2003; Röling 2003). Therefore, competition and control are important elements of the culture discourse. Rarity and desirability of resources are emphasised by consumerism and those who have access to the rarest resources are made powerful. Issues of waste production, environmental degradation, pollution, resource exhaustion and even the negative effects on human health caused by a degraded environment are ignored in the pursuit of consumerism and kept absent from social awareness and reflection. Therefore, resistance to action because of climate change can be created because consumers are encouraged to perceive humans as beyond, separate to, or outside of nature (Bowman 2009).

The discourse of culture directly relates current society's massive demand for consumption to the causes of climate change: 'Important environmental threats,

including climate change, can be directly linked to production of commodities' (von Moltke 1997, cited in Clover 2003, p. 8). Therefore, addressing climate change presents a threat to cultural discourses of consumerism.

Consumerism promotes the power of marketing and marketing promotes binaries, such as those of rich versus poor and good versus bad. These binaries often contradict other messages in society, for example, marketing promotions of wealth and luxury contradict climate change messages about limiting the use of products (Sandilands 1999). This contradiction can create rejection of climate change because to believe in climate change and act on it is perceived to involve giving up cultural ideals of wealth and luxury.

In the discourse of culture, equity issues arise around consumerism and capitalism because of the comparison between different socio-economic groups. When responsibility for problems like climate change becomes linked to levels of consumerism, the issue is even further complicated. While westernised countries have contributed more to the causes of climate change through larger emissions of greenhouse gases, fast-growing countries like China and India have much greater energy needs into the future and therefore, are more pressured to use potentially risky alternative energies. As Gulden (2009, p. 175) describes:

> Population growth, growth in per-capita consumption and current patterns of energy generation technology all combine to create a situation where a two to eightfold expansion of the nuclear industry is likely to slant heavily toward the developing world.

Poorer nations and societies are likely to be harder hit by climate change because of where they live, where they work, sources of food, inability to move, their resources and options (Agyeman et al. 2007; Alston 2009; Carvajal-Escobar et al. 2008; Ruth & Iberrarán 2009). This means that the equity debate about who should act, and how much, are morally and politically charged, as demonstrated by the difficulty of achieving international agreement on action, as occurred with the Kyoto Protocol in 1997 and in Copenhagen in 2009.

In the discourse of culture, individualism is an issue that is likely to create resistance to climate change action (Princen et al. 2002). Placing responsibility for climate change on individuals can be ethically contentious as it assumes that everyone is equally responsible and equally culpable (Agyeman et al. 2007). Gore's (2006) movie, *An Inconvenient Truth*, can be cited as an example of climate change information connecting evidence of climate change on a broad scale with an individual's sense of responsibility and environmental concern to promote action and individual agency (Fleming & Vanclay 2009a). Individualising actions to address climate change is problematic in the discourse of culture because individual actions taken to help reduce greenhouse gas emissions, such as planting a tree, recycling, or changing a light bulb, can seem trivial (Princen et al. 2002). At the same time, the actions that are seen as most significant are inhibited by existing social structures and infrastructure (Potter and Oster 2008). There is a lack of options which are appealing, convenient or comfortable and therefore people's behaviours are limited and resistance to changing behaviour is more easily justified (Harrison et al. 1996).

Individual actions to cope with the anticipated effects of climate change, as well as to reduce the worst effects, are important (Tribbia 2007) but the discourse of culture separates individuals from each other and from the environment. Consequently, many people struggle to see their role in a significant collective response to climate change (Bateson 2007). Nationality, socio-economic and gender factors all affect how people feel they should act and how much they are able to act (Carvajal-Escobar et al. 2008). Each of these aspects affect how people are affected by culture and even a significant shift in culture will not resolve this difference in the ways that people are able to act for climate change or the equity issues involved.

Gender and market power

The effects of climate change on different social groups within any one society are not yet well understood and this lack of knowledge is included in the

discourse of culture as a reason for resistance to action, especially as demonstrating differences in impacts of climate change leads to debates over priorities that delay action.

Gender and market power are particular focuses in the discourse of culture because women are culturally targeted more for marketing campaigns, for both eco-friendly and non eco-friendly products, and are more likely than men to feel guilty about poor consumer choices which are harmful to the environment (Clover & Hill 2003). Plastic bag alternatives, bottled water and cleaning agents can all be specifically marketed to women as climate friendly purchases. This demonstrates how 'consumerism is gendered practice and a discourse through which power is both exercised and contested' (Clover 2003, p. 8). Marketing solutions to climate change specifically to women can create resistance to climate change action because of perceptions that small changes in consumer habits are sufficient to address climate change.

> The market has become our most important institution and most of us believe that one can best leave 'free market forces' to design future society (Röling 2003, p. 79).

The perception that market forces will be an effective way to address climate change propagates the values of consumerism and gendered marketing that the literature producing the discourse of culture critiques as the main reasons for resistance to action to combat climate change.

Gender creates different effects and responses to climate change which are only just beginning to be recognised (Alston 2009; Carvajal-Escobar et al. 2008; Lambrou & Piana 2006; McCright 2010; Patt et al. 2009; Sandilands 1999). Gender has been included in discussions about climate change focussing on sexual freedom (Sandilands 1999); health and survival (Alston 2009); equity (Agyeman et al. 2007) consumer guilt and responsibility (Clover & Hill 2003) and emotional reactions (Moser & Dilling 2007).

In the discourse of culture there is a view that failing to recognise differences in gender and gendered marketing is a significant cause of resistance to action.

Culturally, women are constructed to be more connected with the environment, more concerned about the future of the environment for their children, more likely to feel personally responsible and worried about environmental problems and more likely to have the role of educating children in environmental responsibility (Agyeman et al. 2007; MacGregor 2006). These cultural constructions can be potential causes of resistance as women are also more likely to have reduced capacity to act because of financial, practical and technical limitations (Lambrou & Piana 2006) or to feel emotionally overwhelmed and disengaged from the issue (Moser & Dilling 2004). In the discourse of culture, women's higher levels of community engagement, responses to education, coping strategies and skills in times of crisis all mean that women are a crucial audience for behaviours meant to address climate change. Thus far these audiences are being ignored and therefore many behaviour change programs are unlikely to succeed (Lambrou & Piana 2006).

The discourse of culture supports the view that a major cultural shift will need to occur, if the social problems that are causing climate change are to be addressed, because actions people can take are shaped by under-recognised cultural factors, such as gender and market power. These aspects create resistance to climate change action but will require a substantial cultural shift, to an entire revolution of thinking about gender roles, social structures and trade mechanisms. Those in the discourse of culture do not necessarily realise the extent of the changes required and therefore practical methods to produce change are lacking.

Farmer subject positions: absent

Farmers are affected by aspects of consumerism, individualism and gender like any other social group, yet proper understanding of these effects is absent. This means that farmers' capacities for action are not being properly realised and the ways in which they are likely to be affected are not discussed or understood by climate change literature. In the discourse of culture, farmers are not positioned in

any way differently from the rest of society and therefore they are largely absent from this discourse.

Individualised calls for action, either personally or at the industry level, are likely to be ineffective and create resistance due to issues of efficacy and equity. For example, changes to fertiliser use, stocking rates or production methods may seem unfair, impractical or impossible to many farmers. Part of individuals getting involved with their community, whether at the local or global level, relies on a belief that others, including other industries and other countries, will also act (Bulkeley 2000). In this way, the belief that others are not acting, or not acting enough, can create resistance.

Farmers represent a significant gap in theoretical understandings of discourses of climate change. Although they are a social group with a key role to play in actions to combat climate change (Griskevicius et al. 2008), discourses that are relevant or representative of farmers are not included in the current literature on climate change. The current discourses create resistance to action and limit the possibilities for agency because they are not inclusive of farmers' specific interests, needs and concerns and they do not recognise farmers' particular roles and possibilities for action.

Understanding of the cultural, social and political causes of behaviour is limited, despite awareness that these wider understandings are vital in actually changing behaviour (Moser & Dilling 2007). Understanding discourses can achieve the wider social understandings that are needed for creating change and demonstrate the values that are operating in particular contexts, including farming.

Solutions to climate change

Each discourse of climate change advocates particular ways that society needs to change in order to combat climate change. Here, these are termed solutions because they are promoted as all encompassing approaches to address climate change and each privileges particular values and creates resistance to action in

ways that should be examined. For this discussion the solutions are grouped under the disciplines of psychology, economics, education and politics and may have some role to play in promoting behaviour change.

Social marketing is a psychological approach to influencing human behaviour that is becoming popular in the environmental education field (McKenzie-Mohr & Smith 1999) and increasingly discussed in relation to climate change. In social marketing, it is argued that specific behaviours can be changed through the provision of small amounts of information, such as advertisements and rewards for desired behaviours. Social marketing promotes the view that resistance to action is created because actions are perceived as too hard, too expensive or as having no personal or meaningful benefit (McKenzie-Mohr & Smith 1999).

Social marketing targets people's emotions in order to promote change and most of the promoted climate change actions are oriented to individual consumers and target actions that are voluntary, inexpensive and small (Gaillard 2008). The individual is presented with a moral responsibility and a clear procedure for how to act, in a short snippet of information. A commonly cited example of a successful implementation of social marketing is the use of stickers in hotel bathrooms reminding guests to reduce water to save the environment. In this example, the solution is presented as simple and as benefiting everyone. For example in reducing water consumption, businesses can save money on their water bill, the environment benefits and the individual can feel morally satisfied (McKenzie-Mohr & Smith 1999). Social marketing aims to overcome resistance by making actions achievable and rewarding.

There is an assumption in social marketing that although the promoted actions are small, if enough people take part, significant change can be achieved. Therefore, people's desires for doing what is morally right and being involved are targeted. Social marketing targets individuals and assumes that a ground swell of public demand can force businesses and governments to act (Flannery 2005; Stern 2000). Nevertheless, the marketing methods can be problematic and create other

forms of resistance to those that it is designed to overcome. Marketing environmentally responsible behaviour as a moral decision or as a financial saving can risk rejection in a world that is growing cynical of vested interests in information (Anstey & Bull 2004). A high level of trust is required that individual contributions will be translated into broader benefits and this trust is not always in existence.

Social marketing contributes to the discourse of logical action, in that action is assumed to be logical if it is sufficiently persuasive. As farmers often regard themselves as having been ill-affected by different marketed behaviours in the past, they pride themselves as being particularly aware of market spin (Fleming & Vanclay 2009a). Hence, many farmers are likely to reject the use of marketing techniques to create particular behaviours.

Another example of a ready solution to climate change from the discipline of psychology is the discussion of social norms and their influence on behaviour (Griskevicius et al. 2008). A social norm is a behaviour that people take up, often unconsciously, because they have seen others do it. Examples are most apparent in comparisons of different cultures. The appropriate time to eat meals, the correct side of the path to walk on or what to do if you make a mistake in public, all vary between cultures but have become normalised within the culture. In relation to climate change, some scholars advocate the need for changing social norms in order to normalise beneficial action on climate change (Griskevicius et al. 2008; Michealis 2007):

> What's surprising, given the ubiquity and strength of the evidence, is how [seldom] people are aware of the power of such norms on their own behavior, including many behaviors that can contribute to global warming (Griskevicius et al. 2008, p. 6).

Psychological theories of behaviour change use social norms to explain why humans behave in particular ways, often ignoring the reasons why these norms exist in the first place and the values that created them. In other words, they ignore discourses. This omission means that attempts to alter social norms are either, extremely complicated and protracted, or largely ineffectual. Looking only

at social norms as separate from discourse also means that the extent of behaviours, values and power relationships that norms enact are not properly recognised. While there is value in examining social norms for the ways in which they make discourses more visible, without a connection to discourse, changes in social norms are not able to be achieved without changes in discourse.

An example of a ready solution to climate change from the discipline of economics is ecological modernization (Hajer 1995). Ecological modernization emerged in the 1990s due to increasing environmental and sociological concerns about sustainability. Economic modernization emphasises consumer responsibility and business profitability through promotion of the use of environmentally friendly products and sustainable practices. Ecological modernization assumes that everyone can benefit from solutions to climate change and in this way it is similar to social marketing. Ecological modernization aims to 'organise modern production and consumption within sustainability boundaries' (Mol & Spaargaren 2004, p. 262). It views climate change as an opportunity to begin to value the environment more and to include this value in decisions of economic development. Ecological modernization utilises current social structures and markets as the means for promoting environmental awareness and consumer choice.

Ecological modernization promotes the dual goals of environmental preservation and economic progress and it argues for the possibility of creating economic benefit from changing lifestyles, energy use, carbon emissions and so on, through the generation of new markets, such as carbon emission trading schemes (see Bäckstrand & Lövbrand 2007). In this proposed solution to climate change, consumers have the power to create change through their everyday purchasing choices which over time, become normalised and filter into all areas of society. In ecological modernization, price signals are assumed to be sufficient to create change and resistance to action is created because the price signals are not yet high enough, as public demand for environmentally friendly products is not yet strong enough.

Although there is debate about the effectiveness of ecological modernization for addressing the root cause of problems such as current levels of consumption, (Carolan 2004; Princen et al. 2002), it is increasingly cited in the literature as a way to combat climate change. Ecological modernization aligns with the discourse of culture which advocates that broad scale changes in culture are needed. Ecological modernization regards it as possible to create these changes solely through market forces. The central reason believed to cause resistance in the discourse of culture is the reliance on market forces as sufficient to shift society's behaviour, and the corresponding values and beliefs that this propagates. Ecological modernization contributes to this cause of resistance.

Another proposed solution to climate change drawing on discourses of education in schools, is environmental education, which began in the 1960s (Gough 1997). The goals of environmental education are to foster awareness and concern for the environment, to provide individuals with the skills and knowledge to protect and improve the environment and to change behaviour in society as a whole (Gough 1997).

> Environmental education is aimed at producing a citizenry that is knowledgeable concerning the bio-physical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution (Gough 1997, p. 44).

The form of environmental education most often aligned with climate change is education for sustainability (Huckle & Sterling 1996), which takes environmental education beyond the classroom to any audience and includes a particular focus on climate change. Education for sustainability (EFS) is an educational movement developed in the 1990s designed to 'push sustainability to the heart of the education debate, and education to the heart of the sustainability movement' (Huckle & Sterling 1996, p. xix).

A pivotal moment for EFS was the Agenda 21 project in 1992, which emphasised the key role of education in meeting sustainability goals (ARIES 2005). EFS aims to be more transformative than traditional forms of environmental education, by

encouraging holistic learning and advocating practical, environmental change. It supports critical reflection on what sustainability is and means in different contexts. Sustainability, as the ability to provide the world's needs while conserving 'the means and conditions of production' (Huckle 1993, p. 4) is related to local contexts through exploration and practice changes. EFS objectives encourage change and transformation in systems of everyday life at all levels: culture, economics, technology, law, politics and ideology. It aims to achieve this through education, using the learning techniques of envisioning, systemic thinking, critical thinking, participation and partnerships (ARIES 2005).

As yet, in Australia, EFS still remains largely an adjunct to more traditional forms of education and has not expanded beyond the traditional school setting. It is better developed in theory than in practice and is better organised and enacted in particular pockets of society but is gradually increasing in prominence as it becomes more practically grounded and developed (Department of the Environment and Heritage 2005). EFS can create resistance to action if it is perceived as being too environmentally focused and therefore only applicable to certain groups of people. It is a limited solution to climate change because it relies on fundamental changes in the education system including core values about what education is. These are slow to change and politically sensitive.

Another proposed solution to climate change is the discourse of civic environmentalism which is drawn from political literature (Bäckstrand & Lövbrand 2007). Civic environmentalism focuses on creating a new social movement through giving people the power to change society. Presented as a ready solution to climate change because it is a 'radical resistance discourse' (Bäckstrand & Lövbrand 2007, p. 132), it disputes the power regimes of internationally organised and administrative power structures like the Kyoto protocol. Instead, it advocates a bottom-up approach, whereby currently institutionalised social inequalities are challenged and restructured. Civic environmentalism locates climate change within the larger issues of ecological sustainability and equity generally and therefore seeks to address multiple issues

by addressing climate change. While Bäckstrand and Lövbrand (2007) define two branches of civic environmentalism, they both centre on increased civic participation and scepticism of solely top-down solutions, particularly market based and government led mechanisms. Civic environmentalism can be considered as one useful solution to climate change although it is not widely recognised, nor the mechanisms for its implementation well elucidated.

Multiple discourses of climate change

The three discourses from the literature: logical action, complexity and culture, as well as each of the various potential solutions to climate change that have been discussed so far, each strives to promote their particular view as the only source of authority and knowledge about climate change. In this way, farmers are not recognised by any of the discourses as legitimate producers of knowledge and their understandings of climate change are dismissed and ignored, despite general acceptance that varied localised understandings of climate change are legitimate and socially constructed (Hulme 2009; Pettenger 2007; Potter & Oster 2008). Farmers are left to respond to information from the authorised knowledge producers, promoted in the above discourses, by taking up the subject positions open to them or by acting on the various proffered solutions. Social response studies undertaken using quantifiable measures such as polls and surveys, show that there is resistance to action for the various reasons described above (e.g. Bord et al. 2000; Boykoff & Boykoff 2004; Carvalho 2007; Weingart et al. 2000). This further perpetuates the established discourses, as responses are validated and reported by, and to, those who already have power. The cycle of information generation, communication and assessment excludes farmers from relating to climate change in a personal or social way. It excludes them from producing their own knowledge or participating in evaluating knowledge about climate change (Potter & Oster 2008).

As demonstrated above, there are overlaps within and between the discourses and the solutions. Some can exist concurrently, or in different ways at different times, therefore, there are multiple options for thinking and acting on climate change

that are circulating in society, although each does not recognise these other possibilities. A variety of understandings is a potential way of increasing the possibilities for actions.

Increasing agency: combining critical literacy and extension

Modern extension aims to be an agent of change and to be farmer centred. As each application of extension is different, extension needs to flexible, relevant and appropriate to different individual and community needs. This has required a shift in understanding of the diversity of farmers and reasons for farming, as well as the techniques for effective communication and the wider practices needed to support change (e.g. Vanclay 2004). Extension can operate in harmony with education for sustainability and critical theories, because it aims to empower farmers and assist them in creating more positive businesses and farms (SELN 2008). Extension differs from educational theories by focusing on creating the social conditions that enhance learning and support change, also known as social capital, rather than on teaching the knowledge and skills to enable individuals to change, referred to as human capital. Although educational techniques can be utilised in extension, they are not the first priority or sole purpose of extension. Pedagogy – the teacher's values and theory of learning – does not have the central importance in extension that it does in theories of education.

Climate change provides a particularly significant challenge for learning, especially to farmers. Not everyone perceives the physical evidence of climate change, or they may relate it to different causes, because knowledge constructions are grounded in different places and contexts, so awareness and acceptance of climate change will vary from individual to individual. It is necessary to identify the power relations present in climate change facts because awareness of different power relations creates agency to choose between, act within, or work to transform the interests that constrain the needs of farmers. Critical literacy is useful to expose power relationships and to create awareness of alternative possibilities.

The discussion of critical literacy and extension in this thesis is collated from the literature about each and therefore presents an ideal, theoretical view that may not be recreated in reality. Indeed, ideals of each perspective may not be achievable in the field. Nevertheless, connecting the three learning perspectives in the way suggested here can potentially advance each perspective theoretically and provide additional support methods for their implementation in practice.

Comparing perspectives

Comparing education for sustainability, critical literacy and extension highlight some points of difference and of similarity between each view. It also shows how recognition and connection between these approaches could help to support and strengthen their shared goals. In particular, extension and critical literacy can bring the benefits of a greater awareness and analysis of discourse into agriculture and extension.

Table 1 shows in bold the overlaps between each of the three disciplines of education for sustainability, critical literacy and extension, particularly learning, change and transformation. There are potential opportunities for each to learn from the other and no one particular perspective should be considered as the best learning perspective. As this research focuses on farmers, a connection between extension and critical learning theories, specifically through an awareness and analysis of discourse, is argued to be particularly beneficial way to understand and facilitate change in agricultural communities.

Table 1: Summary of the key considerations of education for sustainability, critical literacy and extension.

Discipline	Education for sustainability	Critical literacy	Extension
Philosophy	• Change to a more sustainable world that properly values the environment, is reliant on education for communicating the need to change and the practical methods for change.	• Change to a more equitable, open, free and accepting society requires critical appraisal of how current societies are structured to privilege particular groups and disempower others.	• Change to more effective, sustainable and productive farming practices that benefit the individual farmer and the wider community can be achieved for farmers to improve social capital.
Objectives	• Sustainability • Environmental awareness and protection • Inquiry • Action learning • Interconnection • Collaboration and integration • Public/private participation • Reflection • Engagement • Learning and change • Transformation	• Emancipation • Empowerment • Social awareness and change • Inclusion • Diversity and equity • Acceptance and tolerance • Transparency • Reflection • Engagement • Learning and change • Transformation	• Sustainability • Capacity building • Resilience • Productivity and profitability • Technology development • Network building • Public/private participation • Social support • Reflection • Engagement • Learning and change • Transformation
Methods	• Envisioning • Systemic thinking • Critical thinking • Questioning • Reflection • Hands on experimentation • Local knowledge and local application • Group work for collaboration • Mentoring	• Text deconstruction and reconstruction • Critical thinking • Questioning • Reflection • Language and discourses • Power relations • Group work for diversity • Mentoring	• Field days • Training projects • Models • Demonstration farms • Presentations • Farm planning • Local knowledge • Group work for social learning • Mentoring

Scripts

While the first part of this chapter has been about discourse, extension has for some time been using scripts, which are a related concept. Scripts have been advocated as a way for extension to work more effectively with different groups is to recognise the particular scripts that have power in particular contexts (Vanclay et al. 2007; Vanclay & Silvasti 2009). Scripts are an alternative way of informing extension about the workings of discourse, without the complex theories and analysis that might otherwise be required (Vanclay & Silvasti 2009). Scripts are words and narratives that people use from the public discourses that justify their own views. They can act to create resistance or to limit openness to alternative views. Scripts are commonly occurring stories that have a strong normative character (Vanclay et al. 2007). They operate on an individual basis and connect with/represent different discourses. Scripts represent social constructions of the reasons for resistance, as well as cultural expressions relating to the likely problems encountered and many other issues (Vanclay et al. 2007). They influence how people respond.

Some of the scripts that are present in the literature about responses to climate change are shown in Table 2, adapted from Fleming & Vanclay (2009a). It is not a comprehensive list, as different discourses operate in different situations and involve different scripts. The scripts are based on the work undertaken by Lorenzoni et al. (2007), which explores public barriers to climate change in the United Kingdom.

Table 2: Scripts about climate change that limit action.

Causes: Climate change is natural, it is always occurring. Solutions: There is nothing that can be done. Consequences: It would be nice if it was a bit warmer. Confusion: It's too cold for climate change to be real; we already recycle. Personal experience: I can't see anything different. Capacity to change: I don't know what to do or how to do it. Non-issue: We never talk about it; I'm not interested. Reliance on others for information: X says climate change is a hoax. Uncertainty: There is still much disagreement and before we take action we should wait to learn more. Complexity: With so many factors involved, how can we be sure of the problem, let alone the solution? Magnitude: The problem is too big to attempt. Insignificance (local to global): Others aren't acting so our efforts won't make any difference. Avoidance: It's all too hard. I don't want to think about it. Denial: Climate change isn't the problem, the problem is politics/ industry/other people etc. Doubt: Conflicting information proves it's all a lie. Vested interests: Scientists/media/ politicians/marketers over emphasise the problem to get more money. Environmental issues: Why are we worrying about climate change when we haven't addressed more important problems like X?	Financial issues: I can't care about climate change if I haven't got a job, and can't afford the basic necessities. Other personal issues: My kids/house/relationships etc. are all I have time to think about. Faith: God or Mother Nature (Gaia) has ultimate control. Cosmic: The universe is mysterious we don't know what has ultimate control. Cornucopia: Science and technology will always conquer all problems. Responsibility and obligation: The big polluters are responsible, not me. Leadership: There's no point acting until targets have been set by government. Neo-liberalism: market forces and price signals will solve the problem. Frugality: It's depressing having shorter showers and keeping the heater off. Resources to change: I can't afford solar panels etc; It's impossible for me to do without my car. Habit: I like the way things are and the things that I do. Rejection: I'm not going to become a vegetarian to cut down on greenhouse gas emissions. Time: It is an issue for future generations; there is time to learn more before we act. Space: We won't be affected here icebergs and polar bears are a long way away. Fear, anxiety, hopelessness: I hear so much bad news, I just can't cope. Large issues overwhelm: disease outbreaks, overpopulation, food shortages, extreme events terrify me.	Armageddon: Climate change is catastrophic, we might as well have a good life now. Disaster: A lot of people will have to die before there is action. Distrust: Governments (local, national and international) aren't doing anything so why should I. Ineffective action: Their plans aren't going to work. Corruption: The big companies have too much power and they don't care or don't want to change. Disadvantage: If we take measures because of climate change and others don't, it won't be fair, we won't be able to compete. Consumer culture: If I don't have the fashionable cars, clothes, latest technology etc, I won't be successful. Identity and self perception: I'm not a tree-hugger/greenie. Fad: Save the polar bears. Infrastructure: There are no viable alternatives for me to change requirements for packaging, power providers, transport etc. Equity: (in all forms, e.g. between industries, future generations, countries and different people including genders) It is impossible for action to be equitably managed. War: In the fight against climate change casualties are unavoidable. Altruism: We have a duty to look after humanity, yet it is impossible, we can't suit everyone. Stewardship: We have a duty to look after nature, yet it is impossible, we can't protect everything. Species: We have a duty to look after all species, yet it is impossible, we can't save them.

Awareness of the scripts above by extension practitioners can help to give farmers the agency to acknowledge their subject positions and develop new ones, contributing to the beginnings of transforming discourse.

While scripts are an initial technique to allow those who work in extension to recognise discourses, they are not equivalent to a full discourse analysis. It is important that scripts should not be confused with discourses and do not represent

a sufficient replacement for an understanding of discourses. Scripts can allow a quick assessment of the role of language in particular contexts and may help suggest dominant issues, highlight points of confusion, or reveal emotions that may be working to create resistance to behaviour change. The use of particular scripts without understanding the discourses that produce them can, however, reinforce undesirable values and beliefs of the discourse and result in ineffective attempts to influence behaviour. Therefore, although scripts can be considered a potential tool for extension practitioners to examine the importance of language in particular contexts, they should be used cautiously if awareness of the wider, more influential and therefore more important presence of discourses is lacking.

Discourses demonstrate where barriers for changing behaviour exist at the wider social and cultural levels, not at the individual or infrastructural level. As Kurz et al. (2005, p. 616-7, emphasis in original) explains:

> This barrier is not an individual, psychological one *per se*; it is not something that an individual has, like an attitude. It is also not an external, physical or structural barrier like lack of convenient infrastructure or monetary cost. Rather, it represents something that members of a society are able to *draw upon*, while interacting with other members of that society, to legitimate and justify their existing patterns of behaviour. Such discourses may also allow individuals to justify their own patterns of behaviour to *themselves*.

Discourses are not individual problems of understanding or limits of education. They are social phenomena that are caused by complex factors which need to be addressed at discursive levels. In this way, scripts are a way of operating within established discourses rather than a way of making visible the restrictions of those established discourses or actively changing those discourses.

Farming styles

Another related concept which extension has been using is Vanclay et al.'s farming styles (1998; 2006) based on van der Ploeg's (1994) discussion of farmers in the Netherlands. The approach to understanding different farming styles explains the need to understand farmers' different discursive contexts in

order to understand why particular messages of climate change might be met with resistance and how resistance is multiple and social:

> the sociocultural basis of diversity in farming has been inadequately examined, and has often been neglected in analyses of farming, although it is an area of growing concern. Extension, in particular, has failed to appreciate the significance of the existence of socio-cultural diversity in developing its extension programs and in the targeting of its messages (Vanclay et al. 1998, p. 85).

Awareness and analysis of discourse is another possible method for achieving an increased focus on the social diversity of farming. Like discourse, farming styles are an attempt to incorporate farmers own worldviews, values and beliefs into academic understanding and theorising about farming. Discourses and farming styles are different ways to remember and promote the diversity present in social groups which is so often forgotten. Recognition of such diversity can lead to acceptance of multiple possibilities for action. Farming styles can demonstrate where different discourses with different values, perspectives and purposes, are active in social groups. As with the example of scripts above, it is important that the connection between farming styles and discourses is made explicit, if the benefits of social awareness and diversity are to be achieved, while reinforcing particular values and beliefs which do not promote farmers' agency is avoided.

Good farm management is socially constructed and different for different farmers, in connection with their location, industry, personal values, gender, and family situation. In the same way, communication of climate change information is understood and responded to differently by different farmers. People working with farmers need to understand their diversity to communicate effectively with them about climate change, but this does not mean that more effectively tailored or targeted information is sufficient. Although the right message at the right time is important, wider social practices, values, infrastructure and cultural influences on behaviour need to be illuminated and examined in conjunction with individual behaviour change. This means that the theory of discourse and the effects of particular discourses may need to be understood and changed. Better understanding the social diversity of farmers is an important first step towards

achieving successful change. It allows the concept of climate change to be socially constructed in diverse ways with actions that appeal to more, and indeed, all farmers.

Conclusion

Resistance to change is socially created by discourse and not the fault of individuals, and therefore resistance occurs at social and institutional levels. An examination of resistance can reveal discourses and the subject positions that different discourses construct for particular social groups. Awareness of resistance leads to understanding of the limitations of individual agency and creates an opportunity to change between discourses or to build new discourses.

The reasons people resist action because of climate change are an opportunity to understand the ways in which discourses limit and restrict certain actions or ideas because of the power relations, ideologies and subject positions they work to reinforce and promote. As is now widely accepted in social research, there is a tenuous link between information and behaviour change (Potter & Oster 2008), so it is necessary to look at wider aspects than just the type of information or the manner of information presentation, if behaviour change is to be properly understood and facilitated. In particular, these wider aspects should include the social, cultural and ideological contexts of discourse.

This chapter has discussed three dominant discourses and related solutions to climate change that are present in the literature on climate change science and communication and are here called the discourse of logical action, the discourse of complexity, and the discourse of culture. Each of these discourses understands resistance to climate change action in particular ways and creates farmer resistance in ways which are not necessarily recognised.

Understanding the wider factors through which information is constructed is crucial for understanding people's learning about climate change and whether

behavioural changes are resisted or incorporated into daily life. If society constructs the problems, it can also construct the solutions (Dryzek 1997). The social construction of the problem of climate change is fundamentally a conflict over what the knowledge and facts are and who has the power to produce them. Farmers, in particular, do not benefit from current dominant discourses of climate change and need to be given opportunity to create their own. Understanding the particular discourses present in specific social groups is essential for communication about climate change, because different discourses alter what climate change is thought to be and what it means can and should be done. Therefore, public knowledge about climate change, action taken, or resistance created, is dependent upon the context of the local, multiple, social constructions. Research needs to recognise the context of the different discourses that are at work and how meanings change for the social groups within these discourses.

Only when the social and discursive barriers to action are made apparent will they be able to be addressed. A single hegemonic discourse is inadequate for producing a range of options for climate change action and response by farmers, because many problems associated with climate change are linked to cultural, social and political aspects of the current discourses of society (Clover & Hill 2003; Diamond 2006; Kollmuss & Agyeman 2002; Potter & Oster 2008; Princen et al. 2002). Instead, multiple discourses need to be encouraged. The technique advocated by this research for achieving awareness and acceptance of multiple discourses is through a combination of critical literacy and extension.

CHAPTER 3

From concept to interview: constructivist grounded theory and discourse analysis

This research aims to examine farmers' resistance to changing behaviour to address climate change, particularly at the discursive levels. The approach is innovative in its methodology, its use of farmers as participants and its use of discourse analysis with constructivist grounded theory. This chapter details the methodological principles that were chosen and justifies them in line with the aims and theoretical underpinning chosen for the research. The approach is adapted from a combination of Charmaz's (2006) constructivist grounded theory and Carabine's (2001) genealogical discourse analysis.

Charmaz (2006) and Carabine (2001) were used in combination to create a practical, step-by-step method for the analysis, which is difficult to achieve when using one without the other. As Foucault (1971, 1972, 1979, 1980, 1982) does not provide a clear methodology to follow and as 'a discursive approach, with its resistance to unidirectional causal explanations, offers little in the way of methodological tidiness' (Litfin 1994, p. 7), this practical explication of procedures was especially useful. Carabine's (2001) analysis is a gender study of historical documents and so more important is its genealogical approach and analysis of power. Carabine's (2001) methods were adapted, meaning that less emphasis was given to the historical and gender-specific formation of the discourses and more emphasis was given to the methods of looking for absences, tensions and effects of power. This was achieved by using the same techniques as Carabine (2001).

Charmaz's (2006) method of constructivist grounded theory was combined with Carabine's (2001) steps of a genealogical discourse analysis to examine the research data – a series of open interviews about climate change with selected farmers and agricultural service providers (see below). Charmaz advocates a qualitative approach, where the researcher is recognised as the active constructor of the research, from the generation of research questions, to data collection, choice of methods and actual analysis. This fits with the theoretical framing of the research more than other grounded theory approaches (e.g. Strauss & Corbin 1998; Wetherell et al. 2001), because an objective account of the data is recognised as impossible. Therefore, analytic decisions are made explicit and accounted for at each stage so that a reader can follow the line of argument and is given the foundation necessary to form their own interpretation. Contrary to advocating a single, true answer, this approach aims to open up the findings presented here for wider interpretation.

Discourse analysis is based on the researcher's theoretically informed and value based subjective interpretation of the data enhanced by research questions, literature concepts and personal experiences of the interview – termed constructivist (Charmaz 2006). Analysis of this sort is intended to provide insight into the data that is closely connected to issues discussed in the relevant literature and to the context of the data collection. Familiarity with the literature is used to guide all stages of the research, from the types of questions asked, and the language used in naming the codes, categories and discourses. The analysis is therefore continually grounded in theory (cf. Charmaz 2006; Glaser & Strauss 1967; Strauss & Corbin 1998). Interpretations come from the data, with the literature helping to frame what is looked for, but not necessarily the answers that are found. Current theories from the literature are applied to the data to see whether the data supports, contradicts or is relevant to these theories, but if not, new interpretations can be made.

The data is not forced into any particular frame by being grounded in theory, but continually questioned and re-examined in order to condense and connect the

underlying themes. This approach requires an intense period of immersion with the data and with the literature, as well as records of insights, connections, questions, tensions, refinements and decisions made, all to be recorded as memos (Charmaz 2006). Memos then help to justify and structure the movement of the analysis from low level codes to the more abstracted discourses. Charmaz (2006) recommends using memos to move the analysis forward and this technique was taken as the step between each stage of Carabine's (2001) analysis. Memos are essentially notes, reflections, ideas and questions at different stages of the analysis that help to structure and progress thinking about the data. They are 'written records of analysis related to the formulation of theory' (Strauss & Corbin 1998, p. 197). Memos are written in the style of a fieldwork diary which is useful for flagging potential issues. QSR International's NVivo software was used throughout the analysis to structure and store the data and to allow easy access, refinement, notations and connections at all points of the analysis.

Research assumptions

The assumptions of this approach are clarified below in order to be explicit about the position of the research. The process of explication of these assumptions also requires reflexivity of the whole research process, because interpretations are seen to be subjective and partial and require justification at each stage. This type of reflexivity has been found lacking in some forms of scientific research (Michael 1992; Oleson 2007). The interest in discourse in this research is based in poststructural theory and is social, contextual and aimed at empowerment, agency and change. The research assumptions are an attempt to demonstrate that 'data analysis methods are epistemological and ontological issues' (Mauthner & Doucet 2003, p. 415). In this way, methods of analysis should explicitly cohere with the theoretical positioning of the research.

As Foucault (1980) says, where there is power there is always resistance. Consequently the study of discourse is also a study of resistance and consists of 'using this resistance as a chemical catalyst so as to bring to light power relations,

locate their position, find out their point of application and the methods used' (Rabinow & Rose 2003, p. 129). As argued in Chapter Two, resistance is not only an effect of power (Macdonell 1986), but also an effect of competing discourses, so the research is not solely focused on power, but rather on discourse.

Discourses are multiple, contested, uneven, shifting and contextual. So the study of discourse is contextual and, following Foucault (1972, p. 117), genealogical: 'it is a body of anonymous, historical rules, always determined in the time and space that have defined a given period, and for a given social, economic, geographical, or linguistic area'. That is, the analysis of discourses is located within a particular time and place and is not exactly as the discourses are elsewhere or always.

Discourses work to normalise or privilege particular truths. So the study of discourse is critical: 'no discourse can ever be neutral; it is always involved in circulating and promoting one form of knowledge, of values, of ways of being and living over another; it is involved therefore in promoting the interests of a particular social group' (Morgan 1996, p. 71). Critiquing different presentations of truth in discourse is a key to understanding how discourses promote and inhibit actions.

Discourses circulate at every level of society. So the study of discourse is social and discourses are socially constructed, constitutive, interpretative, subjective and partial. There is no single method of discourse analysis and the aims are not to reveal the real truth behind language. 'The point of analysis is not to expose the hidden truth in all its simplicity, but to disrupt that which is taken as stable/unquestionable truth' (Davies 2004, p. 7).

Limitations of the research, data and methods

Methods of discourse analysis are diverse and varied, and are necessarily adapted to individual projects, areas of interest, and developing technology. While this is

appropriate for discourse theory, which emphasises the contextual nature of the research, it means that the terms validity, reliability and generalisability become problematic. These terms are heavily critiqued within poststructural research because the concept of an inherent truth to accurately record, measure or replicate is rejected (Davies 1993). This means that: 'no longer is there talk of objectivity or validity or generalisability' (Crotty 1998, p. 16). In the context of poststructural research the term rigour is used in a general sense referring to sound research, professionally and ethically undertaken, which extends established theories and methods, posing findings that are plausible and relevant. Thus, while validity, reliability and generalisability are no longer useful identifiers of rigour in poststructural research, triangulation can still enhance rigour by providing multiple sources of data and a data set large enough to allow a balanced and authentic analysis.

In poststructural research, reflection at all levels of the analysis helps to enhance rigour as it demands a high level of interrogation of the data and justification of the conclusions made at all stages of the analysis. As they are being formed, emerging interpretations are continually tested against the original data to ensure the insights being drawn are supported. Rigour is also enhanced by the analysis occurring over time, to allow ideas to settle and be re-examined afresh, as long as familiarity with the data is maintained. Objectivity is not the aim of a discourse analysis, but rather the goal is a subjective, relevant and contextual interpretation justified by the data, the literature and professional, systematic methods of data collection and analysis.

Combining methods of analysis

Charmaz's (2006) method of constructivist grounded theory was deliberately combined with Carabine's (2001) method of discourse analysis because they complement each other and because they both follow many of the same principles. This is demonstrated in Tables 3 and 4, in which Carabine's (2001) stages of analysis are presented alongside those of Charmaz (2006).

Box 1: Carabine's steps for analysis.

1. Getting to know the data
2. Identifying themes
3. Looking for evidence of interrelationships among discourses
4. Identifying the discursive strategies that are deployed
5. Looking for absences and silences
6. Looking for resistances and counter discourses
7. Identifying the effects of discourse
8. Situating the analysis in the broader discursive context
9. Attending to the limitations of the research, your data and sources.

Source: Carabine (2001, p. 281).

Box 2: Charmaz's steps for analysis.

1. Data collection and coding (open)
2. Memo writing (occurs throughout)
3. Further coding (initial, axial)
4. Category and theme formation

Summarised from text: Charmaz (2006, p. 11).

Personally transcribing each interview is the first step toward becoming familiar with the data and thinking about the key words and ideas present. It allows the experience of the interview to be relived and memories of the event to be refreshed. The process of transcription is slower and more detail oriented than the initial interview so that a new perspective on the experience and a thorough initial reading of the interview is enabled. Reflective notes often ensued. Transcriptions of the interviews were sent to participants to be checked and amended where required. Personal comments and reflections were often made by the interviewees at this stage. These comments usually expressed excitement, interest or surprise, for example, 'I didn't realise I said that!' or 'I've been thinking about things a lot since then and I want to add …'. This demonstrated that many of the participants

enjoyed the opportunity to talk about their experiences of farming and climate change.

After transcription, the first stage of analysis is coding. ‘Coding means that we attach labels to segments of data that depict what each segment is about’ (Charmaz 2006, p. 3). It represents the ‘operations by which data are broken down, conceptualised, and put back together in new ways’ (Strauss & Corbin 1998, p. 57). The first round of coding, termed open coding, is designed to: ‘discover, name, and categorise phenomena’ (Strauss & Corbin 1998, p. 181). Dominant concepts in the transcripts are coded at the sentence level through asking questions such as: What does this sentence achieve? What is the purpose of this sentence? Comparisons are made throughout this process so that names of codes are refined and settled on for the best fit with the data. The process is open because the names of codes at this preliminary stage are still flexible.

The discovery of new codes requires previously coded transcripts to be checked anew, so coding is circular and consuming. While reading through a transcript, the dominant meanings are ascertained and named, then later collated and counted. This occurs on a line-by-line or chunk basis, depending on how many words were used to convey the same meaning. Some segments of transcript could be coded more than once, but only if there were two equal possibilities of purpose and meaning. Observations and reflections from the interviews were also coded when relevant.

While the data collection is informed by the ideas that were developed in the literature review, once open coding has begun, further engagement with the literature is avoided until after the initial codes have been decided. This is to avoid reading ideas into the transcripts that are not supported by the data. The subsequent analysis is again informed by the literature as the data is questioned in a range of ways, including comparisons to the ideas generated from the literature. Interrogating the data is not intended to reveal the essential meaning, but to explore multiple, and different, possible interpretations. All of the coding is

related closely to memories of the physical experience of the interview, observations about the respondent, research questions, background reading and personal understanding of the transcript text. This subjectivity is embraced and regarded as beneficial as it allows a useful closeness with the data, to make interpretations about meaning through the experience of the interview that others might not see in the transcript alone. Also, this recognition then demands careful reflection and continual questioning of the emerging interpretations, to make sure that they are embedded in the data, are relevant and defensible and are useful for providing insight to the research question and not imagined by the researcher.

Data sources

The data for this research are predominantly interview transcripts, supplemented by journal entries including personal reflections and observations relevant to the interviews and a small number of other climate change documents (e.g. industry and government information brochures) referred to or provided by farmers.

In 2008, interviews with people from the apple and dairy agricultural communities in Tasmania, Australia, were carried out. This included: 20 apple and 22 dairy businesses, 5 agricultural consultants working with the apple industry and 5 with the dairy industry. The two industries are concentrated in different geographical areas. Apple growers were predominantly from the southern part of Tasmania with dairy farmers predominantly situated in the north west of the state. The agricultural consultants came from both localities and worked in a mix of public and private sector organisations. Further, 5 climate scientists working on relevant climate projections from the Climate Futures for Tasmania project were also interviewed. The total number of interview transcripts for the project was 56 and the total number of people involved was 68. Ethics approval was obtained from the Tasmanian Social Science Human Research Ethics Committee, approval number H10168 (2008).

Data collection methods

The interviews were designed to provide an opportunity for the interviewee to talk as freely as possible, both in order to relax the participants and to enable them to speak in their own vernacular so as to accurately capture the discourses influencing their thinking. Consistent with in-depth interviewing techniques, this meant that questions were kept open and statements or comments by the researcher were limited to those that would assist the interviewee to continue talking. The interviews were conducted by the researcher, an experienced teacher of adult literacy, accompanied by a retired medical practitioner with a long professional experience of open interviews, acting as a research assistant. Generally, the participants relaxed quickly and a satisfactory level of rapport was achieved early in the interview.

The interviews were predominantly face to face and held in the home or office of the interviewee. At times, other family members or business partners were present and were included in the interview where possible. The majority of the interviewees were middle aged, white and male. Only 12 women were interviewed and of these, seven were partners interviewed together with their husbands. There were no particular specifications for the interviewees (e.g. in terms of gender or age) beyond identifying with the apple or dairy industries. The interviewees were sourced through personal contact with industry leaders, attendance at group meetings, conferences, meetings and field days and then through a snowball technique, by which interviewees suggested the names of others who might also be interviewed. The interviews were conversational and open-ended in order to ascertain the interviewee's dominant concerns. The topics explored in the interview related to issues that had been discussed in the literature and were used to stimulate verbal reflection on the issue of climate change as relevant to all spheres of the personal life of the interviewee. The interviews averaged around 30 minutes, with some extending to as long as 1.5 hours depending on the way the interviewee engaged with the topic and the amount of detail they wanted to cover. Generally, if the interviews were longer than 40 minutes, the discussion tended to stray away from climate change and the interviewee was more likely to get tired, distracted or agitated about missing

work. A list of starting prompts is provided in Box 3, but the number of questions asked depended on the extent to which the interviewee felt comfortable to talk, with further questions being asked when encouragement or clarification was needed.

Box 3: Typical interview prompts.

Tell me about yourself and your farm/business role?
What do you think about climate change?
What is climate change?
What do you think causes climate change?
Is climate change something new?
Where do you get information about climate change?
How do you think climate change will affect you and your business?
Are you doing anything personally to address climate change?
What is your industry doing?
What do you think of the carbon pollution reduction scheme?
What else would you like to see the government do?
What is the biggest risk to your business?
How do you feel about the future of farming?
Do you have an image you associate with climate change, say, from the media?
What do you think about the ozone layer?
Can you name the greenhouse gases?
What is sustainable agriculture?
How are you sustainable?
What do you think is the difference between weather and climate?
Do you talk about climate change with family or friends?
Do you have anything else you would like to say?

As this research explores resistance to climate change, the interviews focused on views on climate change and actions being taken in an attempt to address climate change. As the interviews introduced no recommendations, did not express any experience in the industry and made no judgement about the responses, interviewees usually became quite enthusiastic, explaining industry procedures, describing personal opinions and enjoying the opportunity to reflect about concerns that one interviewee said: 'weren't usually thought about'.

The questions were open-ended in order to probe the limits of ideas and to see what connections the interviewees made. If a particular aspect was absent, for example the role of carbon dioxide in climate change, this was not taken to be evidence of ignorance or error. It highlighted the aspects that were less prevalent in farmers' minds, with some issues such as water vapour as a greenhouse gas and land clearing as a source of carbon dioxide seldom mentioned.

Construction of discourses

Patterns and connections began to emerge during the transition of the analysis from coding to categories in the process of description and memo writing. There were four dominant and recurring themes around concepts of money, the Earth, human responsibility, and questioning of information. These were examined in more detail as categories were grouped under these theme headings. Each was then questioned and described in another process of analysis as memos were written in response to: Why do these categories fit together as a theme? What is the effect of combining these categories? Why do these categories not fit under any other theme? Are these themes visible and supported in the data? Are the connections from individual code, to category, to theme, stable and logical? Are the themes operating as discourses?

Discourses are particular ways of talking about the world that circulate particular power relations and embody particular ideologies (Foucault 1972, 1979, 1980, 1982). Each of the different themes identified in the analysis uses different

language to discuss climate change and this frames climate change in different ways and has different effects. Therefore, the themes are considered equivalent to discourses.

Once the themes were interrogated to determine whether they were operating as discourses, the discourses were fully explicated and described, so that analysis of the ways that resistances were created and action inhibited or encouraged could occur. A full description of the discourses also included what was ignored and silenced. This means that what each discourse avoids talking about, or what ideas are dismissed or presented as ridiculous and/or impossible, were also examined. Discourses enact power through normalisation, that is, they promote a particular reality as the only reality and therefore give that reality power. Looking for the absences and silences in discourses disrupts this normalisation process, to make apparent the other possibilities for reality that are pushed out by the discourse. 'The question proper to such an analysis might be formulated in this way: what is this specific existence that emerges from what is said and nowhere else?' (Foucault 1972, p. 28).

Each discourse competes with other discourses and all discourses promote particular relations of power, which simultaneously create resistances. Therefore, looking at the most powerful discourses requires highlighting the resistances to these discourses. Counter discourses that exert resistance to the dominant forms of discourse occur when discourses grow and become unable to account for everything, or fit with all people. Counter discourses demonstrate the points of powerful discourses that are incomplete or unsatisfactory and most open to the creation of new discourses from change and transformation.

Identifying the effects of discourse on action was examined through the particular language/thought connections that inhibited action and therefore how other language choices might open up possibilities for other ways of thinking that promoted, or did not discount, action.

Conclusion

This chapter has introduced the methodological principles that were used to guide the research methods and described methods of analysis consistent with the theoretical positioning of the research. The methods of Charmaz (2006) and Carabine (2001) were adapted to allow an analysis of action and resistance to climate change action. The process of these methods is explained in more detail, with examples to illustrate, in the next chapter.

CHAPTER 4

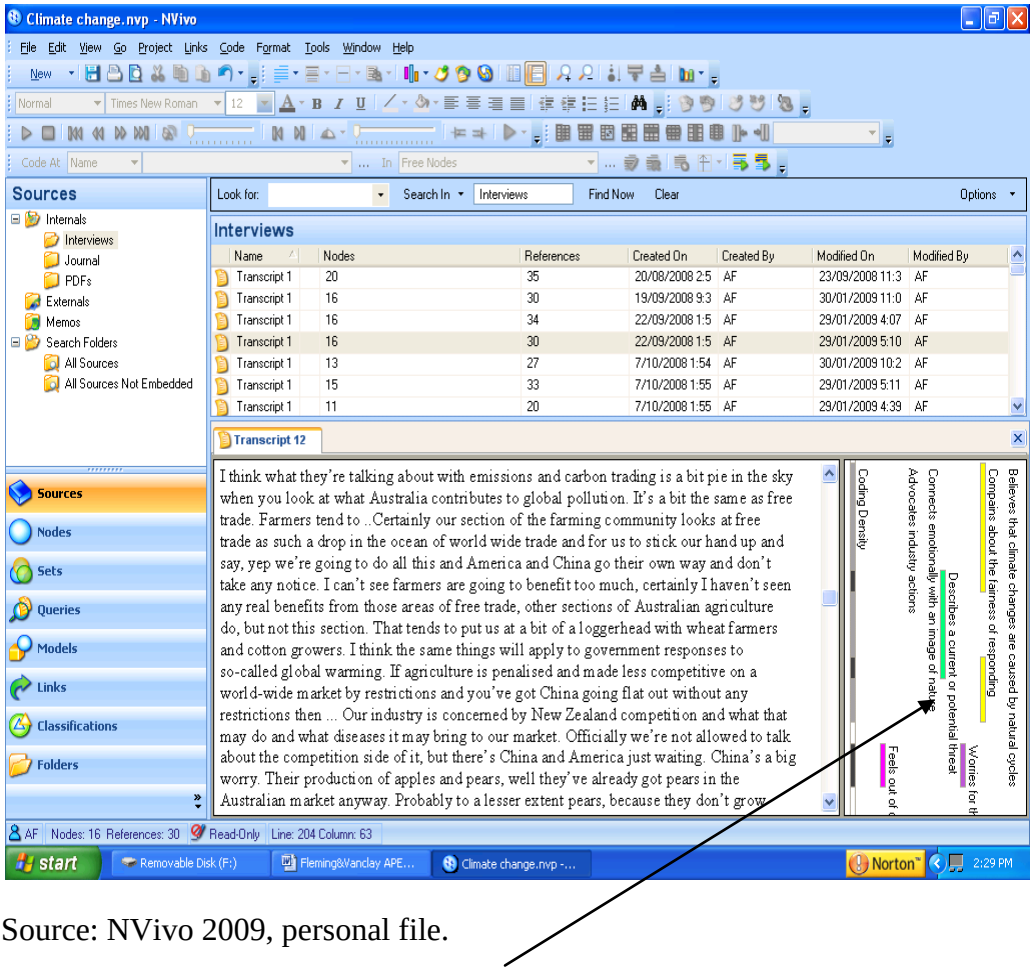
Preliminary analysis: from transcripts to categories

As described in Chapter Three, the methods of research move from coding, to categories, to themes, to discourses and is adapted from a combination of Charmaz's (2006) constructivist grounded theory and Carabine's (2001) genealogical discourse analysis. Using this type of discourse analysis means that if these methods were to be carried out in exactly the same way again, the results might well be different, because of the spatial and temporal dependence of the data collected and the interpretative nature of the analysis. Nevertheless, the methods should be replicable and generally applicable. This chapter combines a description of the methods along with initial results, to explain the procedures of the analysis. Examples are given throughout to demonstrate the methods and also, in line with poststructural theory, to be as explicit as possible so that readers can scrutinise the analysis and potentially develop new insights for themselves.

Coding

To begin with, codes were described in a process termed open coding. Over time, the names of the codes were clarified and refined so that the key concepts and nuances of meaning were effectively captured. From this point the code names remain unchanged and were termed 'initial codes' (Charmaz 2006, p. 48). This demonstrates how the first step of analysis is a complicated, lengthy, multi-step procedure that is essentially about getting to know the data as richly as possible. Figure 2 is an example of how coding works using NVivo.

Figure 2: Screenshot showing coding.



Source: NVivo 2009, personal file.

In Figure 2, there are a series of coloured bars depicting the segments of parallel text that have been coded following Charmaz (2006). There are two codes visible: 'Describes a current or potential threat' (green bar) and 'Complains about the fairness of responding to climate change' (yellow bar).

Open coding

In the process of naming the codes, memos are written to describe individual codes, to compare them to other codes, to detail their characteristics, how they might be recognised in the transcripts, and what their limits are. These memos are written in response to questions and they form part of the coding analysis process. Examples of these questions include: Why is this code different from another? Why is it significant enough to stand alone as a new code? Why has it been given

that particular name? Does the name describe what is occurring in the transcript? What concepts are included in the code? What concepts are excluded?

NVivo software was used throughout the analysis to structure and store the transcripts, memos and the developing codes, and to help allow easy access, refinement, notations and connections at all points of analysis. Below is an example, taken from NVivo, of part of a memo written during the open coding process.

Box 4: Memo excerpt.

> Information and Uncertainty codes
> The difference between uncertainty and more information is quite fine but important, uncertainty is the unknown, with no way of knowing how to make it known. More information is specific to needs or complaints about information that is lacking. More information also includes attempts to get more information, positive assumptions that more information is out there or will be forthcoming and support for research and education. Uncertainty is more disabling as a restriction or as evidence that action is pointless or unnecessary or too early (therefore it is a barrier, while more information is a way forward). Uncertainty is also fuel for doubt, scepticism and distrust whereas more information is based on general acceptance and gives impetus for moving forward.

The memo demonstrates how the differences and connections between codes are an important part of the process of the coding analysis. It also shows how the naming of codes is a significant step because it constructs, defines and limits the phenomena that are found in the transcripts. The codes described in the memo belong to the initial codes ‘expresses uncertainty about climate change as reality or as actionable’ and ‘pinpoints specific needs for more information’ (see Table 3). This demonstrates how settling on the names of codes – the movement from open coding to initial coding – is part of the process of analysis which creates a unique and personal interpretation.

Initial coding

The final names of the codes use present tense verbs in an attempt to capture the active purpose in the phenomena being described (Charmaz 2006). The codes were informed by the researcher's theoretical sensitivity (Strauss & Corbin 1998), and directed toward answering the research question: what are the reasons for farmers' resistance to climate change? Therefore, the codes are about understandings of climate change and evidence of action and barriers to action, rather than, for example, about farmers' use of water, which might be a relevant code for a different study of climate change and was strongly present in the transcripts collected. Through this process, the large number of open codes found is reduced to the initial codes relevant to this research and those listed here are quite particular and unique to this analysis and form the first level of sorting or limiting the data.

The initial codes created from the data are listed in Table 3. Numbers are for reference and recording purposes and not for ranking. Similarly, the frequency of codes is useful for describing and showing relationships between codes and for providing a record of the analysis but it is not intended that they be used for establishing an order of importance. Recording the frequency of the codes is the first step in identifying discursive patterns in the transcripts.

Table 3: Initial codes.

Code name and number	Frequency
1. makes observations about landscape change	69
2. advocates adaptation	34
3. advocates personal actions	126
4. advocates industry actions	66
5. advocates social actions	40
6. advocates government actions	41
7. connects emotionally with an image of people	9
8. connects emotionally with an image of problems	6
9. connects emotionally with an image of nature	19
10. demonstrates a negative emotional reaction to the topic	22
11. demonstrates conflation of different issues	37
12. describes a current or potential threat	108
13. expresses a worry for the future	69
14. expresses the urgency of action	10
15. describes the complexity of climate change	19
16. expresses distrust in science and/or government	77
17. expresses uncertainty about climate change as reality or as actionable	77
18. emphasises economic viability	46
19. values environmental stewardship	33
20. expresses concern about natural resource limits, scarcity and control	43
21. advocates working together	13
22. emphasises the power of social networks	18
23. sees opportunity for Tasmania in a changed climate	133
24. distrusts the media hype	45
25. highlights/agrees with the scepticism about climate change	57
26. believes climate changes are caused by natural cycles	86
27. believes Mother Nature is beyond human influence	17
28. complains about the fairness of responding to climate change	77
29. believes there is time to act later	35
30. emphasises other issues as more important	87
31. states climate change is a non-issue	16
32. points out the limitations of social norms	13
33. states that personal actions are pointless	28
34. points out the limitations of infrastructure	8
35. accepts the scientific evidence of climate change	55
36. pinpoints specific needs for more information	33
37. assumes a technology fix can and will be found	27
38. places trust in science	39
39. discusses government responsibility	60
40. describes industry progress	67
41. feels out of control of the future	46
42. believes climate is a problem for future generations	26

Identifying themes/memo writing and category formation

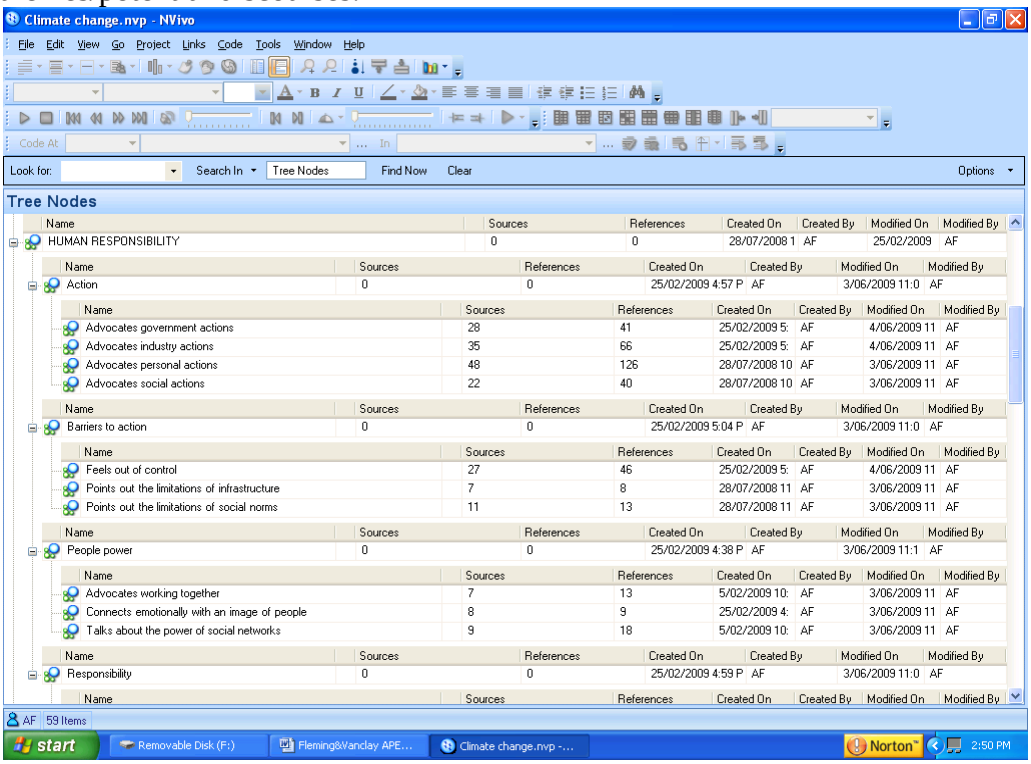
During the open coding process, the codes were named with key words and stored in the 'Free nodes' section of NVivo. Detailed descriptions about each code were recorded in NVivo memos in order to keep a record of the types of meanings included at particular codes. This process represents the beginning of identifying themes. Open coding name changes were recorded and explained and examples or key words noted in the properties function of NVivo to help keep codes authentic, relevant, comprehensive and distinct. This technique was also used to clarify any confusion between codes that had some overlap. The final coding names are the initial codes. These were described in more detail in memos to help start the process of identifying connections between them that would allow them to be grouped into categories. Memos were also used to reflect on why some codes were more prevalent in the transcripts than others.

After all the interview transcripts had been coded, a list of all codes created was generated. This was then analysed and grouped into categories in a process termed 'axial coding' (Strauss & Corbin 1998, p. 96). Concepts were 'grouped together under a higher order, more abstract concept called a category' (Strauss & Corbin 1998, p. 61). Each code contributes to only one category. The categories were created in a way that helped to add further depth to the scope of the codes, and the process used memos to identify similarities and points of connection. For example, codes that achieved the same purpose but in different ways, or focused on different aspects of the same concept, were grouped together. Descriptions of each category were written up to draw out the connections between the codes and to indicate how they overlap to reinforce particular ideas, or approach a particular concept in different ways. Again, this was not a one-step process; much reflection and re-reading of the transcripts, experimenting and rearranging the codes into different hierarchies in NVivo and writing memos of ideas and evaluating these, led to the development of the categories. An initial hurdle was encountered by grouping the codes into those with similar names, rather than grouping the codes with the same function, e.g. code 39, discusses government responsibility is more

aligned with code 33, states that personal actions are pointless, rather than code 6, advocates government action.

The memos at the category stage also suggested potential themes and these ideas were highlighted and expanded in memos, exploring their connections to initial codes, to observations and to the literature. This allowed a kind of theoretical test of the potential discourses. Exploring connections in this way, both theoretically and practically within the data, foreshadowed looking for interrelationships among discourses. In this way, the analysis process is not linear, but rather multiple points happen at once, and different points of analysis can be revisited and revised.

Figure 3: Screenshot showing the hierarchy of codes, categories and themes/potential discourses.



Source: Nvivo 2009, personal file.

Figure 3 shows the hierarchy of codes, categories and potential discourses in NVivo. The theme or potential discourse shown is 'Human Responsibility' with four categories visible: 'Action', 'Barriers to Action', 'People power' and

‘Responsibility’. The remaining icons belong to codes placed under their respective category.

Axial coding – constructing categories

From the list of initial codes, axial coding is the first step in grouping the codes to a higher level of abstraction, in which more layers and complexities of meaning can be created. Axial coding is: ‘a set of procedures whereby data are put back together in new ways after open coding’ (Strauss & Corbin 1998, p. 96). This process is achieved by connecting and comparing codes and checking them against the interview transcripts.

The process of axial coding, that is, the construction of categories, follows a similar path to that from open coding to initial coding. Axial coding is a more flexible and exploratory part of the development of categories. Again, memo writing is an important tool for moving the analysis forward (Charmaz 2006). Memos are written to describe connections between codes and to explore tentative category names, to detail their characteristics, how they occur, what their limits are, and what they might contribute to understandings of the research question. As in the coding process, these memos are written in response to posed questions. Sample questions include: What connects the codes? What differentiates them? What new concepts are gained by connecting the codes? Is this new concept still consistent with each code individually? Is it relevant to the research question? Are all the codes active in creating this new concept? Are all the codes relevant to this concept included? These questions have the purpose of drawing out the relationship between codes and form the first stage of the development of categories. Below is an example of part of a memo taken from NVivo, during the axial coding process.

Box 5: Memo excerpt.

> Hip pocket
> This category is about finances, growth and competition. It is about how climate change can be fixed by market solutions, and therefore is cannot be fixed yet, because cost effective solutions (technological) and consumer demand are not high enough. It is about how climate change represents a cost to the public in general and farmers specifically, and how it is increasingly hard to maintain profit with competition from the world market, consumer ambivalence, supermarket monopolies and marketing and government requirements, of which the carbon pollution reduction scheme is the latest addition and possibly will push many farmers over the brink of viability. The consequences of this category are that climate change is seen as a cost, as a threat to the current way of business and to the economic stability of Australia.

The above memo is titled hip pocket as an 'in vivo' category name – originally a term used by the interviewees that was utilised in the analysis. This title was later rejected because it was too limited in representing the defining concept of the category and instead the category was later named Business viability (see below). This demonstrates that, as with the naming of codes, the naming of categories is a significant part of the analysis process.

Categories

The final contents and name of each category was decided after a process of detailed analysis, questioning and exploration, verified at the end of each cycle against interview transcripts, to make sure that the category concepts were still relevant and consistent. Table 4 presents a list of categories and the codes that are connected to form that category. As with the codes, each category is numbered as a means of labelling and recording, not as a means of ranking. A combined total of the codes are given as an indicator of the prevalence of the category in the data. As this research is qualitative, not quantitative, these numbers offer interesting insights and comparisons, but are not meaningful beyond a record of the prevalence of the codes in the original data. Following the sorting of the codes into categories, each category was described individually in order to make explicit the ways that the particular combination of codes created adds a conceptual understanding that is relevant to understanding farmers' responses to climate change.

Table 4: Categories.

Category Name and Number	Codes included	Combined Frequency
1.Business viability	12. describes a current or potential threat 18. emphasises the importance of economic viability 23. sees opportunity for Tasmania in a changed climate 30. emphasises other issues as more important	374
2. Action	3. advocates personal actions 4. advocates industry actions 5. advocates social actions 6. advocates government actions	273
3. Global equity	10. demonstrates a negative emotional reaction to the topic 28. complains about the fairness of responding to climate change 33. states that personal actions are pointless 39. discusses government responsibility	187
4. Responsibility	1. makes observations about landscape change 8. connects emotionally with an image of problems 14. expresses the urgency of action 19. values environmental stewardship 35. accepts the scientific evidence of climate change	173
5. Community	7. connects emotionally with an image of people 21. advocates working together 22. emphasises the power of social networks	40
6. Waiting	36. pinpoints specific needs for more information 42. believes climate is a problem for future generations	59
7. Barriers to action	32. points out the limitations of social norms 34. points out the limitations of infrastructure 41. feels out of control of the future	67
8. Faith	2. advocates adaptation 29. believes there is time to act later 31. states climate change is a non-issue	85
9. Mother Nature	26. believes climate changes are caused by natural cycles 27. believes Mother Nature is beyond human influence 9. connects emotionally with an image of nature	122
10. Market solutions	37. assumes a technology fix can and will be found 38. places trust in science 40. describes industry progress	133
11. Confusion	11. demonstrates conflation of different issues 15. describes the complexity of climate change 17. expresses uncertainty about climate change as reality or as actionable	133
12. Distrust and scepticism	16. distrusts science and/or government 24. distrusts the media hype 25. highlights/agrees with the scepticism about climate change	179
13. Resource limits	13. expresses a worry for the future 20. expresses concern about natural resource limits	112

Category One: Business viability

Business viability connects the codes that express the importance of keeping the farming business viable and profitable. These codes are: code 12, describes a current or potential threat; code 18, emphasises economic viability; code 23, sees opportunity for Tasmania in a changed climate; and code 30, emphasises other issues as more important.

In this category, climate change is not perceived as bringing significant changes to Tasmania, and opportunity will come through production capacity remaining the same, or increasing slightly. Tasmania is seen to be sheltered from severe impacts, while other competitors, interstate and overseas, struggle with more serious changes. An example demonstrating this is: 'Tasmania probably has an advantage to gain from the weather fluctuating as wildly as it is in the rest of the world and we've got a relatively temperate climate here still, it's really interesting. I think we've got big opportunities with climate change if we go along carefully.' *Apple grower.*

As climate change is not perceived as bringing too many physical changes to production capacity, other issues of business viability are more important and immediate, including the global financial crisis that was developing at the time, labour shortages, constraints of free trade, supermarket monopolies, decreasing markets and returns, political decisions and increasing costs of production. Compared to these other issues, climate change seems to be a passing fad: 'Time is very, very valuable and we're all under pressure, so growers are really in survival mode mostly and growers can't be running all the time with every latest issue of public interest.' *Apple grower.*

The dominant concerns of farmers in this category relate to the economic viability of their business, and while the connection between the drought and rising prices of grain and fertiliser is accepted, climate change is not perceived as a major factor in influencing financial concerns. The end result is that as long as there is water – and it is assumed that there will be – climate change will mean

that things will be no different, or comparatively better, for Tasmania. An example of how climate change is likely to advantage Tasmania, with the assumption of sufficient water, is:

> Some cold, frosty mornings you think, roll on climate change! (laughs) In the middle of winter, when it's freezing cold, I can't wait for climate change to get here! I'd rather be here than in a drier area that's going to get worse. At least it does rain here occasionally. So as it dries out a bit more and gets warmer it's probably not going to affect us as much as some areas of Australia and the world. *Dairy farmer.*

All of the codes in this category are about issues of business viability being more important than the effects of climate change. Nevertheless, the effect of climate change on political decisions is seen as a potential threat to business viability, and therefore climate change may turn out to be problematic for farm business in terms of social consequences, rather than natural ones. This can be seen in the example: 'There's a limit to how much sleep I'm going to lose over it, I know it's not going to change my business overnight, so I wouldn't be anywhere near as interested in it if I didn't see what people were doing at a political level to limit our ability to do business.' *Dairy farmer.*

Category Two: Action

This category combines codes about action across all spheres. These include: code 3, advocates personal actions; code 4, advocates industry actions; code 5, advocates social actions; and code 6, advocates government actions. These codes connect into a category because they are all descriptions of what are thought to be actions to respond to climate change. Descriptions of actions that are vague, contradictory or not necessarily successful or relevant to climate change are also included in this category, because they are still perceived as actions. For example the following confusing statement was reported as an action taken to address climate change: 'We've got to change, and we're doing it, that's why all this planting is going on to lower production, increase production, that sort of stuff.' *Apple grower.*

Many actions the interviewees stated as being beneficial to address climate change were also acknowledged as primarily occurring for other reasons. This demonstrates farmers' confusion about what actually counts as action in response to climate change. Awareness of the environment is counted by interviewees as a positive action, even if it does not actually change behaviour, because the intention, or knowledge of what is right, is seen to be the first practical step towards change. This can be seen in the statement: 'We do do some things. I normally burn our net wrap and I know we shouldn't do that, whereas 20 years ago, you wouldn't have given it a thought.' *Dairy farmer*.

Advocating that others should act instead of personally acting is also important in this category. This demonstrates that it is easier for interviewees to name the actions that others should take, rather than the ones they should take themselves. Common examples are for what government should be doing, as shown by this statement: 'I think there should be more promotion of grass roots sustainable living in your own house: solar, insulation. There should be more government funding for that.' *Apple grower.*

All of the codes in this category demonstrate that farmers are strongly influenced by practical issues and the desire to be seen to do the right thing by the environment and they are typically keen to emphasise that: 'We're all finding now that the way ahead is to work with the environment.' *Apple grower*.

Category Three: Global equity

Global equity is a category that combines: code 10, demonstrates a negative emotional reaction to the topic of climate change; code 28, complains about the fairness of responding to climate change; code 33, states that personal actions are pointless; and code 39, discusses government responsibility. These codes are connected because they represent the conflict that epitomises this category: that equity of climate change actions on a global level is necessary but impossible. A key issue in this category is that governments should be responsible for dictating how people should act in order to be fair, and yet there is a belief that government

will unfairly target particular groups more than others. Individual actions are unfair and ineffective unless everyone participates, but fairness cannot be achieved until legislation is created. For example: ‘Solutions have to be government, at a fairly high level. Tasmania is one percent of Australia and Australia is three or four percent of the world. So, me planting a gum tree doesn’t make much difference.’ *Agricultural consultant.*

This category also includes negativity about the inequity of climate change actions and how it is important for the bigger emitters to act more, for example specific industries or individual countries. As the statement below indicates, the problem is seen to be caused by big corporations: ‘The big offenders are the big corporate companies and they get away with it, with money, whereas ordinary people, they contribute but not as massively as big corporate companies.’ *Apple grower.*

As bigger emitters are seen to be more responsible, fairness would dictate that they act more, but this is also recognised as being unfair in this category, because it is important that action is taken equally across all industrial sectors and all nations. Without everyone contributing, the effort to change is seen to be wasted. This is particularly talked about in relation to Australia taking up a carbon trading scheme when other nations do not, as shown in the comment: ‘I think Australia is better off to try and focus their energy on coercing the other countries, the other western economies, to do something together, because without everyone all going in together, it’s a waste of time, a complete waste of time.’ *Dairy farmer.*

Frustration is a key indicator of this category, as there is a strong belief that changes at the global and political level are the only realistic way forward, despite acceptance that current global political structures tend to unfairly place the burden on farmers. This can be seen in the statement: ‘They can make it hard for our industry if they go too far. If we penalise ourselves too hard, and the likes of India and China aren’t doing anything, it’s not really achieving anything anyway.’ *Agricultural consultant.*

Category Four: Responsibility

This category connects: code 1, makes observations about landscape change; code 8, connects emotionally with an image of problems; code 14, expresses the urgency of action; code 19, values environmental stewardship; and code 35, accepts the scientific evidence of climate change. These codes form a category because they are about recognising the general negative impacts which humans cause to the environment and the need for action to help to rectify these. This category is not specific to climate change, and can often be vague, but urgent, about environmental problems. For example: 'I think we should stop the amount of pollution that we do. We've really got to get on top of that. There's a lot more people than there was 50 years ago, it's almost double the population so we cause a lot more pollution. We've got to get better.' *Dairy farmer*.

The specific causes of environmental problems in this category are not clear and therefore the actions to be taken are difficult to pinpoint. Scientific evidence for environmental problems is included in this category to prove that there is a problem, rather than to prove the causes. Science is not fully understood in this category, although it is trusted. Acceptance that environmental problems exist demonstrates a trust in science, but this trust does not extend to an understanding of how to act. This vague trust in science can be seen in the example: 'I think it's an issue that we've got to address, it's a real issue, it's not something that scientists have plucked out of the air and said we should do something.' *Dairy farmer*.

Included in this category is code 8, connects emotionally with an image of problems, which refers to an image depicting confusion or other problems such as air pollution. It demonstrates the feeling of discomfort that is central to this category because there is a problem that needs to be fixed, but there is no concept of how to do it. For example, one farmer struggles to relate an obvious environmental problem to their own practices: 'As humans we pump out a lot of pollutants into the air. I've been to Bangkok and it's not very pleasant there. The only clean air is about that far off the ground (indicates small space with hands). I

wouldn't like to see Australia become like that. But from a farming point of view, I'm not sure what our impacts are.' *Dairy farmer.*

There is a tension between recognition of serious problems and a lack of agency to act, as demonstrated by the vague seriousness in this example: 'The risks are so great, we'd better take some action.' *Agricultural consultant.*

Category Five: Community

Community is a category that combines: code 7, connects emotionally with an image of people; code 21, advocates working together; and code 22, emphasises the power of social networks. All are about addressing climate change being positive because it brings people together. Improving practices for climate change can actually be an enjoyable process because it allows meeting with others and learning together, as shown in this comment: 'So you get together, not that often, but when you do some really good stuff comes out of it, what everyone's doing on their farm. Stuff you think you're doing well, but you really don't know, and then something like that will put it in front of you, and you can say: *We have been doing that ok, but here's where we can do better*.' *Dairy farmer.*

This category only refers to the aspects of climate change that have an effect on people, particularly the more vulnerable groups in the world, including people isolated in country towns, children and the poor. It captures a moral and emotional need to act for fellow humanity. The way to act is everybody working together, demanding leadership from the top level. As one farmer explained: 'It has to start from a grass roots level and then move up. Once it starts from a grass roots level, there's a push to government to say this is what we need, we need the resources to help us do it and then the government will act.' *Apple grower.*

This category includes statements of the importance of sharing information with friends and neighbours, forming community groups and targets, and being involved with schools and local councils to set the right example. An example of

this is: ‘Our local school, we had a meeting up there the other night and the only light on was in the hallway where we were, whereas before there would have been three or four lights on for security, so they’re adapting stuff at school which is going to save the school money, but it’s also teaching the kids as well and getting them to actually understand why leaving a light on all day is not on.’ *Dairy farmer.*

This category recognises the power of people and therefore it includes a concern about the spread of negative messages about climate change hindering its capacity to engage and connect with more members. This is a problem because as many people as possible are needed to successfully create change. As one farmer stated: ‘Get in there and do the best you can, that’s all you can do and if we all work together we can try and get something.’ *Dairy farmer.*

Category Six: Waiting

This category includes code 36, pinpoints specific needs for more information and code 42, believes climate change is a problem for future generations. These are a category because they are specifically future focused and related to the need for better knowledge. This category frames climate change as only possible to be fixed in the future, when more and better information is available. Action now is pointless because of the multiple complexities in emissions measurements, industry targets and cost effective solutions. This is especially true for the complexities in agriculture, as shown in this comment: ‘We need to have good information for policy makers to consider some of these aspects of it, like dairy and agriculture is not like a coal fired power station – it’s a lot more complex.’ *Agricultural consultant.*

Problems with information credibility, quality and specificity demonstrate the impossibility of knowing the real ‘truth’ of climate change. So there is a need to wait until things become clearer. In this category, things are not likely to really be understood until they have already happened, in which case it is too late to act for prevention. Guessing at the future is pointless, particularly when it comes to

climate. This is shown by the comment: ‘There’s a lot of predictions in the past that don’t amount to a great lot and it’s very hard to say until it actually comes to pass.’ *Dairy farmer.*

Information about climate is seen as coming from an expert somewhere else, not as able to be produced or found personally. Therefore it is best to wait for valid, proven information to be supplied. Useful information does not exist yet, and major advances will need to be made for it to be able to be produced, as suggested by the statement: ‘They don’t have enough data. That’s the trouble, they have a big picture and they can’t get it smaller.’ *Agricultural consultant.*

The long timeframe for reliable information about climate change is recognised as being problematic, because if climate change is real, then it will be too late to avert disaster when enough is known. Waiting is therefore acknowledged as being selfish because inaction now may cause problems in the future. Despite this, open acknowledgement of selfishness does not show guilt but rather resignation, because even if something should be done now, nothing worthwhile can be done with current levels of information. A number of interviewees recognised their own selfishness with statements such as: ‘I don’t think it will worry me, that is the selfish view point.’ *Agricultural consultant.*

In this category there is a view that it is pointless to try to change the behaviour of current generations and instead that it is necessary to start afresh with future generations, teaching them good habits and responsibilities. These lessons are not seen as a personal or family undertaking, however, but the responsibility of the state and the education system. As one farmer says: ‘Get it in the schools, the kids are the way.’ *Dairy farmer.*

Category Seven: Barriers to action

This category combines: code 32, points out the limitations of social norms; code 34, points out the limitations of infrastructure; and code 41, feels out of control.

These codes cohere because they capture the feeling that current ways of life are not able to be changed in time to avert a major environmental catastrophe. Behaviour change is seen to be only possible when it comes from major changes in current infrastructure including public transport, consumer systems and structures of government. As one interviewee described: 'Effective action comes from systemic change, such as creating a better transport system so people don't have to drive their car, and actually making it more economically advantageous to take public transport will solve the problem rather than every single person having to be motivated to take proactive action to walk or ride a bike when it's much more convenient to drive a car.' *Climate scientist.*

Other barriers to behaviour changes are social norms, cultural ideologies and actions that are justified because everyone else does them, especially relating to wasteful use of resources. As one farmer noted: 'Australia has been a very prosperous country, the world has been very prosperous and there's been a race out there to buy a bigger car, buy a bigger boat, have a bigger house, have 10 televisions, and it really was a race to put the biggest carbon footprint on the Earth that you could.' *Apple grower.*

Responses in this category centre on the problems inherent in culture and human nature, and the need for major, sweeping social changes to transform these problems. Yet these types of transformations remain difficult to implement and the only suggested routes for social transformation are via education reforms or media campaigns that are simultaneously critiqued as ineffective. For example: 'I think the media have got a pretty bad track record in actually providing a role in education and educating the public, which is a real pity because a lot of people read the paper and believe what they read.' *Agricultural consultant.*

In this category, personal changes are seen as meaningless until enough people act because actions have been made easy and convenient, required by law, or achieved through sufficient social pressure. This creates feelings of hopelessness that the problems are too great and too hard to fix because things are already

getting out of control. Many interviewees expressed concerns such as: ‘You can see what we’ve done to the world with eight billion, what are we going to do with over four billion more?’ *Apple grower.*

Category Eight: Faith

Faith is a category that combines: code 2, advocates adaptation; code 29, believes there is time to act later; and code 31, states climate change is a non-issue. This category is made up of codes that are primarily about the lack of human knowledge about who or what really controls the vastness of the universe and beyond, and the corresponding lack of human capacity to impact on it. For example: ‘We don’t know the universe at all, yet. They don’t know how big it is, they don’t know how fast it’s growing, so we’re one very small planet in a very, very big scheme of things. There might be stars further out, it could be anything.’ *Dairy farmer.*

In this category, adaptation is the only possible response to not being in control because whatever changes occur, humans can do nothing except adapt. Adaptation in this category is related to the process of evolution and farmers are perceived to be especially able to adapt, as shown in the statement: ‘Farmers adapt pretty well anyway and they adapt to really big changes over short times so they should be able to adapt to a gradual change over time.’ *Agricultural consultant.*

In this category, climate change is seen to be a non-issue. If it is occurring, then adaptation will occur when it is really necessary, at a later stage and there is no immediate cause for concern. As one farmer states: ‘There are people saying in the short term, we’re going to be in big trouble. I don’t believe that, maybe in the long term, and that’s how we should address it as well, in the long term.’ *Dairy farmer.*

This category frames the Earth within the wider cosmos and, therefore, considering the size of the universe and our current understanding of it, nothing that occurs on Earth can really be that important and is therefore not a concern. Faith in external powers is the focus of this category, including, but not limited to, faith in God: 'Someone else up there has got to sort that one out, we just have to adapt our farming practices.' *Dairy farmer.*

Category Nine: Mother Nature

This category combines: code 26, believes climate changes are caused by natural cycles; code 27, believes Mother Nature is beyond human influence; and code 9, connects emotionally with an image of nature. This category is formed from codes specific to the Earth and her beauty, majesty and power. It is closely related to images of Gaia (Lovelock 1979) or Mother Nature as awe inspiring, god-like divinities that have power beyond the capacity of humans to understand or influence. This category is named 'in vivo' using the term Mother Nature because it was so commonly used by the interviewees who demonstrated the codes in this category. Both Category Eight and Category Nine are about spirituality, but the key difference is about the level of human significance. In Category Eight, Faith, humans are completely insignificant and climate change is largely irrelevant. In Category Nine, however, humans are one part of the complexity of the Earth that Mother Nature balances and controls, and climate change is seen as a natural and inevitable process. This is shown in the statement: 'Being a farmer, I believe strongly in the powers of nature. I guess the climate over our known history is always changing, so why should it be expected to stay the same now? It's going to change, whether man influences it or not.' *Apple grower.*

In this category, Mother Nature is seen to be quite capable of maintaining the Earth's equilibrium, no matter what humans may do, even if that means the eventual extinction of the human race with increasing natural disasters, epidemics and food shortages. The end of the human era is seen as the inevitable fix to climate change, which is largely regarded as being caused by natural cycles and controlled by Mother Nature. This is demonstrated in: 'Well, things like

extinction of the dinosaurs, they say carbon emissions with volcanoes back millennia, we've been through that sort of thing and the Earth righted itself.' *Agricultural consultant.*

Natural images related to climate change are included in this category, including images of rising sea levels, El Nino and drying landscapes. These examples demonstrate how natural systems inspire awe, or fear, and demonstrate factors too complex for humans to really understand. One farmer described a vision of climate change as: 'the sea coming up and swallowing the Earth.' *Dairy farmer*. This demonstrates how nature is perceived as a powerful entity that inspires fear and fatalism.

While this category does not regard human action to mitigate climate change as efficacious, this belief manifests in a spiritual acceptance of the powers of Mother Nature. The natural evolution of the Earth is an amazing phenomenon that provides comfort because it is part of an awe inspiring system: 'The evolution of what Mother Nature has provided us with, she's quite capable of working the system.' *Apple grower.*

Category Ten: Market solutions

This category combines: code 37, assumes a technology fix can and will be found; code 38, places trust in science; and code 40, describes industry progress. This category coheres because these codes are about using the science of climate change to develop solutions and produce technology to fix any problem. This category encapsulates a cornucopian ideal which is linked to industry actions, because business needs will create the allocation of funding which will spur on the development of the required innovations. For example: 'Of course we'll find an answer, we've found an answer to everything else. There's nothing that we haven't been able to beat one way or another.' *Dairy farmer.*

In this category, technological solutions are seen as coming predominantly from industry or from farmers. This creates a sense of optimism and places the responsibility directly in industry hands, as this farmer believes: 'The reality is we'll be able to do almost anything with a plant or an animal.' *Dairy farmer.*

Responses in this category recognise that science has an important role to play in helping industry achieve their goals and so science is trusted to provide the necessary information from which industry can create the ways forward. This is shown by the comment: 'If we can find out about things enough, then we can do something about it.' *Dairy farmer.*

This category is not about action for the environment like Category Two, it is about action for the financial benefit of industry. Climate change represents an opportunity for industry, both in terms of mitigation, to fill the market needs for climate innovations and climate responsible products, and to facilitate adaptation and create competitive advantage. This means that industry needs to be involved from an early stage: 'The industry should be the leading end saying this is what we want to achieve. Let's be on the forefront.' *Apple grower.*

Category Eleven: Confusion

Confusion is a category that combines: code 11, demonstrates conflation of different issues; code 15, describes the complexity of climate change; and code 17, expresses uncertainty about climate change as reality or as actionable. These codes form a category because they share a focus on the complexity and uncertainty of climate change information. Climate change information is seen to require high levels of qualifications and knowledge across diverse fields that encompass science, social and personal impacts, policy, and solutions.

A common example emphasises an inability to understand climate information:

> I don't know. I don't understand it enough. I read about it, and hear about it, and I can't comprehend it. I can't understand how we give our trees and our carbon to someone to do something. I can't

> understand how that works. I can't work it out. I think it's someone taking advantage, someone very clever, or a con person, who has worked out there's money to be made. Down the track, it might prove to be how it is, but I can't see it. I'm not educated enough to understand it. *Apple grower.*

In this category, a perceived inability to sufficiently synthesise or evaluate information equates to confusion about climate change as an issue generally. This is shown in the statement: 'They talk about CO_2 and all these things. I don't know. Greenhouse gases seem to be tied in with this climate change thing, but there's plenty of CO_2 in the atmosphere, plants use it to grow, I just can't get my head around it.' *Apple grower.*

Statements that demonstrate conflation of particular ideas are included in this category because they demonstrate confusion. For example, confusing other environmental problems with climate change, such as the hole in the ozone layer, is demonstrated by the comment: 'Climate change is just another part of the hole in the ozone layer.' *Apple grower.*

Other problems of conflation include confusing appropriate solutions to combat climate change with other environmental actions, such as recycling. Many farmers also confused climate and weather, for example: 'You know this has been the coldest winter we've had for a long time, so I don't know what happened to climate change this year.' *Dairy farmer.*

Climate change in this category is perceived as one more environmental problem to add to the list, and is attributed to the imagination and hype of green groups. Guilt is created because of not feeling able to understand information and discern the difference between vested interest and truth. An inability to simplify climate information and make a clear decision was a frustration expressed in this interviewee's statement: 'People either want to know, yes, it either does or it doesn't, and there's so many things that we're still not sure about and it's hard to explain that to people.' *Agricultural consultant.*

Category Twelve: Distrust and scepticism

This category combines: code 16, expresses distrust in science and/or government; code 24, distrusts the media hype; and code 25, highlights/agrees with the scepticism about climate change. The codes in this category share a focus on the distrust of the vested interests in climate change information, and questions about who is benefiting from climate change thus exhibiting doubt over existence of the problem. For example: 'Science is so linked to funding, and scientists, instead of being people who were once called upon to give evidence in court and held up in high esteem are now people who will sell anything and talk any crap to get the next lot of funding because it means so much to them, some scientists.' *Agricultural consultant.*

Similar to the Y2K bug phenomenon, climate change is seen to be an issue blown out of all proportion and largely imagined so that a select few can achieve financial gain. Statements discussing prominent climate science sceptics, bogus climate consultants, or suspicious government requirements are given as evidence of the vested interests involved in climate change that show it is all a fantasy, as shown in this statement: 'You start to distrust the scientists, a lot of people start to see a dollar in climate change. We've seen it in a lot of other things, the Y2K virus and even the way they try and exploit the devil cancer. You start to wonder are they fair dinkum, or do they just see a money stream in it.' *Agricultural consultant.*

In this category, the media is particularly targeted as inflating the story of climate change to sell papers, as being untrustworthy and unreliable, and as skewing the facts of climate change to the point where it is impossible to know what is real. Talking about the media attention that climate change has received and the political ends it will create, one farmer said: 'I'm a little bit cynical about the importance that's being placed on it to date, and also the measures they're going to take to solve climate change.' *Dairy farmer*.

There is a perception in this category that it is now politically incorrect to disbelieve climate change and that it is fashionable to be pro-climate change. This idea further fuels the distrust in climate change as a passing fad. This category also believes that it is just a matter of time until the hype dies down and a more objective decision about the extent of the reality of climate change can be made, but at the moment information is too biased to allow a clear verdict. As one farmer stated: 'I don't know. There's a lot we don't know. We only know what they want us to know.' *Dairy farmer.*

Category Thirteen: Resource limits

This category combines: code 13, expresses a worry for the future; and code 20, expresses concern about natural resource limits scarcity and control. This category combines these codes because they are about the natural limits of the Earth and the impossible rate of consumption of resources. Concerns about population, food and water, security, and farming land are central in this category. As one farmer describes:

> The biggest problem will be how to handle the population. Everything's caused by increased population. We've got a lovely lifestyle in Tasmania, why? Because we've only got half a million people. It will change quickly if we suddenly get one million or two million. Land prices will be through the roof, the whole thing will change. I reckon the population is the problem. Eventually, because of what we're doing, there'll be, without doubt, one of these bird flu things, one of these pandemics. It's inevitable. That's going to happen somewhere. We don't blink an eyelid when 10 000 people die in a third world country, which they do. We've all forgotten about the tsunami pretty quickly because it didn't affect us here, but if you had a tsunami that hit Australia, say on the eastern seaboard where 70 percent of people live on a coastal fringe, it would be pretty devastating to our population. So the population is the problem. *Apple grower.*

Also included in this category is a concern about the impossibility of current lifestyles to continue on at such a rate, and that humans have already experienced the best years. That things are soon going to get worse is shown in the comment: 'We can't keep going the way we are, the way the world is going.' *Dairy farmer.*

In this category, climate change is indicative of the increasingly impossible weight of the human population on the Earth as a natural system. As one interviewee describes, the problems of climate change will make the problems already occurring because of the sheer numbers of humans now on the planet, far worse: 'Climate change will exacerbate it, you think there's boat people trying to get here now, wait till x years time when there's 20 billion people in Asia and there's no food. More people, poor growing conditions, less food, wars, that's what I see.' *Agricultural consultant.*

In this category, there is no faith that problems will be taken care of by an external force like God or Mother Nature, and therefore there is less passive acceptance and more panic as the rapidly approaching future is a vision of wars over resources, sickness and mass starvation. There are fears for security in all its forms, where inequity of resources makes the world politically, religiously and biologically volatile and unstable. Feelings of resignation and hopelessness are indicative of this category. For example, one farmer describes: 'It just frightens me in these developing countries, what's going on, Eastern Europe probably, India, China, economies booming. I just don't know how the whole world's ecological system can cope with that much interference. It's just frightening.' *Apple grower*.

Themes

After description, the categories were analysed again and grouped into themes, to provide a more abstract description of the connections. They were then described in detail and further analysed to explore the tensions, contradictions and implications of the dominant beliefs and ideas they represented. There is overlap and contradiction between some of the themes, however they each provide specific and very different insights into farmers' responses to climate change, especially in terms of how they might be positioned to act or to resist taking up advocated actions.

These themes were then subjected to a further process of analysis to see if they were operating as discourses and so elevate them from themes to discourses, if appropriate. The themes were interrogated to discover what ideologies they supported, how they represented reality through language, what they privileged and included, what they ignored, and where possible tensions existed. In this analysis it became clear that the themes were acting as discourses because they utilised distinctly different types of language and incorporated different values, assumptions and actions. Each theme used language to frame ideas in different ways and to different effects. This means that they could be seen to be acting as discourses. The analysis was successful in identifying four discourses that the interviewees were embedded in. Each discourse was not equally represented in the data, nor were individuals embedded wholly in one or another, but the discourses were clearly distinct. This suggested that the research question: How might these discourses inhibit or promote action in response to climate change, could begin to be answered.

Box 6 contains part of a memo, taken from NVivo, which describes the combination of categories under the theme of the Earth. At this stage of the analysis, it began to emerge that the themes were actually acting as discourses. To confirm this, the four themes were interrogated to see whether they were using different language, had different effects on values, beliefs and actions, and therefore were indeed operating as discourses. Box 7 shows the organisation of the themes into potential discourses, with the categories that are combined into each theme and the key issues that link them.

Box 6: Memo excerpt.

This group of categories is about the way nature is divine, unknowable and powerful and will save us in the end, whether that means wiping us out with a disease outbreak or cooling the planet again in a cycle. In this way it is linked to the assumptions that climate change is a natural cycle and also to adaptation - that humans can/will adapt to whatever natural changes occur. There is a peaceful acceptance to this group, some religious qualities that it is out of human hands and also some cosmic overtones, that the earth is part of a much bigger system that we can't begin to comprehend - so who knows where the ultimate control really lies and why worry about it? It also links in with time - that it is an issue for the future, because nature works at her own pace, slowly, and human lives are short. This group arises when people think that nature is too big to be influenced. Generally there is acceptance that as humans we do have a negative impact on the planet, by producing unnatural things, burning up resources, over-populating etc. so there are links to scarcity and limits because nature is something to be valued, but at the same time this will all 'be taken care of' by a higher order, at some point, generally much later. The natural way of things is population boom and collapse. Trying to avoid this collapse is futile and not personally relevant. There is some sadness about the future of the human race but also general hope that the planet will survive (with or without society as we know it).

Box 7: Categories into themes/potential discourses.

MONEY: The discourse of profit, market fixes, growth, technology and competition.
Category One: Business Viability.
Category Three: Global Equity.
Category Ten: Market Solutions.

THE EARTH: The discourse of divine power – Mother Nature/ the cosmos.
Category Eight: Faith.
Category Nine: Mother Nature.
Category Thirteen: Resource Limits.

HUMAN RESPONSIBILITY: The discourse of the power of people in creating problems and solutions.
Category Two: Action.
Category Four: Responsibility.
Category Five: Community.
Category Seven: Barriers to Action.

QUESTIONING: The discourse of questions, scepticism and distrust.
Category Six: Waiting.
Category Eleven: Confusion
Category Twelve: Distrust and scepticism.

Interrogating the potential discourses showed that each of the groups appeared to operate as a discourse in the data, because they each promote a different perspective of climate change. How they operate as discourses is examined in more detail in Chapter Five.

Conclusion

Coding breaks down and conceptualises the data from the transcripts at an individual language or sentence level; categories are recombined in new ways that shed insight into the data, and discourses then group multiple categories together to demonstrate the more complex, higher level, real world consequences of language use. In the next chapter, the farmers' discourses are explained and critiqued.

CHAPTER 5

The analysis: interrogating discourse

An examination of farmers' discourses and how these create resistance to climate change action is the intention of this chapter. It is informed by the discourses discussed in Chapter Two, which come from a critical reading of the literature on climate change, whereas the discourses described in this chapter come from a discourse analysis of spoken interviews.

Four discourses were constructed from the analysis described in the previous chapter. They contribute to the presence of farmers' discourses of climate change in the academic literature, but are a deliberate construction from the data and therefore are one partial and subjective interpretation. Nevertheless, this interpretation goes some way to filling a gap in practical understandings about how farmers feel it is necessary or sensible to act in preparation or response to climate change.

The discourses are named the Discourse of Money, the Discourse of The Earth, the Discourse of Human Responsibility and the Discourse of Questioning. Each is discussed below, using multiple illustrative examples from the transcripts.

The descriptions of each discourse highlight how each uses language differently and to different effects. Language binaries, perceptions and relationships of power, and absences and overlaps of each discourse (Carabine 2001) are used to demonstrate how resistance to climate change is produced by the discourses. The discussion addresses the research questions of what the causes of resistance to climate change at the discursive level might be, how they might inhibit climate change action, and potentially how they might be addressed. After the discourse

analysis, the conflicts and overlaps between discourses as well as the connections with other literature are discussed.

Each of the four discourses strives to account for more than just views of climate change. They promote particular ways of life, of the future and of how society could be structured. Some discourses may support the status quo while others challenge it. Climate change may be seen as real or imaginary, as anthropogenic or natural, and as actionable or unactionable. Therefore, different and complex understandings of climate change are included within each. Nevertheless, each shares a particular type of thinking about climate change and is motivated by particular views and actions which are shared within the discourse.

Each discourse is introduced using a pertinent transcript example and then an extended discussion using multiple other examples. The discussion moves from a critique of the specific example to that of the discourse generally to emphasise that one particular discourse does not equate with any particular person or any particular example. Therefore in this section 'it is discursive practices and not individual subjectivity which are interrogated' (Hiller 1998, p. 16). People can take up different discourses at different times and can embody multiple discourses simultaneously.

Discourses are never static and therefore the following descriptions are snapshots of the discourses within a specific time and space context rather than comprehensive, finite or definitive accounts. Nevertheless, discussion of the discourses in this way allows many insights into farmers' understandings of climate change and the possible actions available. Discussion that recognises these influences on understanding and actions has so far been absent from the literature about climate change and agriculture.

Box 8: Discourse of Money transcript excerpt.

Interviewer:	What do you think about climate change?
Dairy farmer:	What do I think? It's happening.
Interviewer:	Do you think it's going to affect you?
Dairy farmer:	We're probably going to be least affected here than most places, I think because of where the properties are situated. I think the North West is probably going to be less affected than anywhere else. I don't believe in some of the doom and gloom. Where there's change, it doesn't necessarily mean disaster, it just means things will be different.
Interviewer:	What sort of differences are you expecting?
Dairy farmer:	Longer summers, we've seen that in the last couple of summers. Probably more significant weather events, more storms, that sort of thing. In other places, like where we used to live, a lot more dry years there. But you learn to adapt, everyone adapts.
Interviewer:	Any thoughts about the causes of climate change?
Dairy farmer:	No. I don't necessarily think its CO_2 emissions everywhere because the climate's been changing, it's always changed. Ten thousand years ago we had an ice age. I think the world's been warming up for the last ten thousand years. Certain effects, certain pollution, obviously help but whether it's cows burping – which I totally disagree with – because the amount that they put out, it's an excuse I think, by big business to try and blame things on others. You've only got to look at where the worst pollution is, where's the worst smog? It's all in the industrialised cities, so that's where most of it comes from. I was in China last year, you can't breathe and you can't see. We could see probably three to four hundred metres, that was it. It's just this grey smog. You wake up in the morning, cough, cough and this muck comes up out of your throat and it's the air that does it. So places like that, that's where the problems are. And it's a third world country trying to catch up to the rest of the world and the rest of the world can't really blame them for wanting to do it. America is still the biggest polluter.
Interviewer:	What can we do?
Dairy farmer:	Here? Very little.
Interviewer:	In China?
Dairy farmer:	They can use cleaner practices, try and get away from using the worst pollutants, some of the coals that they use. Try and bring better practices. Same with the [United] States, same with the rest of the world. The western world has got to lead it. If they don't lead it, it's not going to happen. But mucking around here in Australia when the rest of the world is not doing anything, it's economic disaster ... I think taxes
Interviewer:	On cows (laughs)
Dairy farmer:	Not just on cows but taxes to change climate, is not the right way to go, I think we'd be far better off spending money to actually help create better technology. A tax is just a tax, that's it.

In this excerpt, the dairy farmer demonstrates that their main concerns about climate change are in terms of business viability and equity of action on an international level, rather than as a major change in the environment. Changes in the physical environment because of climate change are perceived as part of

normal processes of climate variability, which are gradual and relatively minor and able to be managed through adaptation. The most important issue is how society, particularly governments and other countries, will impose constraints on business. In the excerpt, the farmer does not perceive climate change to be a particular concern, but other environmental problems, such as air pollution and the impacts of industrial development, are seen as serious personal threats.

This farmer does not perceive their other environmental concerns to be related to climate change but recognises that they do provide evidence that humans cause significant environmental problems. Air pollution is noted as a particular problem that is visible and they remember a negative experience of coughing and choking because of air pollution. The farmer states that other countries and other industries are responsible for the problem of air pollution and by extension all other environmental problems. Consequently, others are given the responsibility for solving the problems. In this case, China and the United States of America are seen to be predominantly at fault because their size and speed of economic growth are contributing so massively to pollution. These countries are seen as especially obligated to impose stricter practices on polluting industries and to fund new, cleaner technologies. Agriculture is not regarded as part of this scenario.

The transcript excerpt in Box 8 encapsulates many of the key aspects of the Discourse of Money. The categories included in this discourse are: Category One, Business Viability, Category Three, Global Equity and Category Ten, Market solutions. These all share a focus on maintaining a profitable business and economic growth, supporting technological and financial market fixes and orchestrating opportunity through competitive advantage. Climate change is perceived as being able to be overcome or managed through current cultural and social structures, particularly market forces and technological innovation. In this discourse, climate change is not a major concern and is not expected to provide a significant disruption to business as usual. Beliefs about the cause of climate change are not overly important and often ignored, because they are seen to be

outside the circle of influence of individuals. ‘It doesn’t worry me what’s causing it; I just know it’s happening.’ *Dairy farmer.*

Language is used in this discourse to frame climate change in terms of money. Common words are: viable, effective, efficient, maximisation, profit, cost, loss, growth, advantage, competition, risk, practical, affordable, tax, adaptation, technology, innovation, government legislation, leadership, fairness and equity. ‘It’s easy to say we’ve got to do things but do what and how do you do it sensibly, at least cost? That’s where it gets difficult.’ *Agricultural consultant.*

The Discourse of Money frames climate change in polarising binaries of: cost/benefit, risk/opportunity, adaptation/mitigation, gradual/sudden, minor/drastic, science/nature, us/them. These language binaries limit thinking about opportunities for action. Climate change is perceived as expensive and risky to act on now and as possible to adapt to gradually, with progressive improvements in scientific innovation. It is expected to affect other areas more drastically than Tasmania, which means that others have more imperative to act first and farmers here can benefit from taking note of how effective their efforts turn out to be. Acting early to prepare for anticipated effects and accepting any kind of personal responsibility for the causes are precluded in this way of thinking. Consequently, there is no motivation for involvement in collective action, either at the community, local government or national level, because climate change impacts are only considered in terms of individual business viability and profit. If others are more seriously affected, it is a potential business advantage.

High level, government action is important in this discourse, as it leads to regulation and legislation for pro-environmental practice changes, but there is concern that actions, costs and impacts are shared equally. It is recognised in this discourse that fairness would demand that everyone acts equally, yet it is also understood that this is not practical, as everyone has different capacities and responsibilities for action. Government is not trusted to manage these different

capacities and responsibilities effectively, especially in terms of the financial restrictions or taxes they will impose. ‘It’s the bureaucrats that will make the decision. The biggest problem with them is they haven’t got the real world experience.’ *Apple grower*.

There are concerns in this discourse that government processes rely on standard policy procedures that are not effective. Rather than a climate tax, the need to create cleaner energy alternatives is seen as essential before any other changes can be achieved. ‘The thing I’d like to see governments in particular do, is really support the alternative energy sectors … Ok, they want to put a carbon tax on coal. Why not just subsidise the other options?’ *Apple grower*.

In this discourse, individual actions are seen as much too small to contribute to climate change and therefore it is pointless for individuals to act. All the responsibility for action lies with external parties and potential actions are scrutinised for the negative effects they will have on business viability. ‘I can just see carbon trading being a lot of red tape for nothing. It’s going to cost us a lot.’ *Apple grower.*

As the gradual changes expected from climate change are assumed to mean gradual adaptation is possible, climate change is only perceived as a threat in terms of what external decisions are made to inhibit production or penalise agriculture. ‘Dare I say it, us as dairy farmers, it’s more of an issue than climate change how the reduction in gases is going to be monitored and charged.’ *Dairy farmer.*

Gradual changes are expected to occur through current social structures, particularly market based price signals. For example, as petrol becomes more expensive, more people will turn to alternatives such as electric cars and the price of production of these will drop meaning that, eventually, a total shift will occur to vehicles powered by some other means. This is also expected to be true for all other commodities. ‘It’s a supply and demand thing. People will get sick of

paying exorbitant prices for fuel. It's already happening, people are buying smaller cars.' *Apple grower.*

Climate change is not expected to create significant physical changes and therefore actions in response to climate change are motivated by political and social requirements and expectations, rather than by concern for the environment. This view corresponds with a perception of sustainability as the ability to maintain or improve production capacity, profit and growth, rather than the state of the environment. 'Sustainability equals maintain profits, so when you talk about sustainability it's my belief that firstly you need to make money, you can't go planting trees if you haven't got enough money to go and buy the trees, obviously.' *Dairy farmer.* In this way, similarities are clearly apparent to Vanclay's (2004, p. 214) fifth social principle; 'it is hard to be green when you are in the red'.

Technology is important in this discourse and it is relied upon to maintain progress and smooth transitions. Agriculture needs to be especially careful to stay competitive with, if not ahead of, what others do. 'At a farm level there's very little we can do to reduce carbon production without the aid of new technology… they're working on that no doubt, to come up with a really good product.' *Dairy farmer.*

Locally, Tasmania is seen to be particularly sheltered from any major environmental impacts and therefore there may be potential to benefit from climate change, if the only difference is a few degrees increase in temperature. 'Everyone would come to Tasmania for winter. It'll be easier to grow grass during winter if it's warmer and drier. Basically the grass stops growing if it's too cold. It the temperature gets below 15-16 degrees it stops. 17-18 degrees it grows. So it would be easier.' *Dairy farmer.*

Even though the extreme predictions of climate change are not a particular concern for Tasmania, the consequences of extreme events elsewhere in the

world are a concern in terms of future business impacts, for example a mass influx of refugees into Tasmania would increase competition for agricultural land and pressure on tax payers. 'That's why you'll see a lot of changes in population. They'll start flooding in as refugees. They'll come here. So that's going to have pressure on general order of society. Society depends on tax payers for hospitals etc. [We're] going to be totally overwhelmed.' *Agricultural consultant.*

Others see that more refugees coming to Tasmania because of climate change creates a potential new workforce and new market. In this discourse, equity issues are considered solely in terms of business impacts, so if other areas become unable to support agricultural production, it increases the value of producing those products in Tasmania. 'Can I be as bold as to say that climate change has the potential to be an advantage to Tasmanian farmers.' *Apple grower.*

In the Discourse of Money, desirable farming practices centre on concerns about effectiveness, efficiency, market relationships and industry positioning. The Discourse of Money privileges values of wealth, success, a comfortable lifestyle through financial freedom, possessions, power through influence, cleverness and hard work. Therefore, farmers' capacities to act are hindered because the costs of early action are perceived as large, unproven and risky. These perceptions conflict with the importance of pursuing financial goals. Delaying action is advocated because it is important to know how other industries, governments and countries will act before changing practices, so that the best positioning can occur. Nevertheless, it is also important to be ready to act quickly so as not to fall behind and close connections with decision makers and information providers are cultivated. 'I think the government should be providing leadership, but if you set the ground rules right you can let business or industry or scientists innovate.' *Agricultural consultant.*

In this discourse, increasing production costs are seen as necessitating either a rise in the price of goods to the consumer or a government subsidy. There is significant concern that farmers have little room to raise the price of their

products and are limited by supermarkets. ‘All around the world farmers are price takers not price setters. Margins for production are just going down all the time, so the global production of food is actually reducing not increasing.’ *Agricultural consultant*.

In this discourse, farmers feel a need to be valued as essential product providers and therefore they should be supported by governments to produce the food required by increasing populations:

> The thing is, the biggest problem I can see for the world coming up is they’re not going to be able to feed everyone because of what’s happening, and the world is changing, and the bigger population, and if the world’s food bowl isn’t growing to meet that demand, if you’re going to be charging farmers extra, they’ve still got to be a profitable business, there has to be a balance there somewhere, otherwise they won’t have the farmers making the food and everyone will starve. *Dairy farmer*.

Those located in this discourse are against Australia acting to address climate change, either independently or more than other countries, because of fears of a loss of competitiveness. Calls for Australia to be a world leader or an environmental champion are rejected because of Australia’s size, population and limited ability to contribute significantly to global emissions reductions. Fears about legislative responses to climate change decreasing competitiveness are further strengthened by the already numerous factors that decrease competitiveness for agriculture in Tasmania, such as distance from the market, input costs and market share. ‘Growers can’t afford to make the change unless they’re getting a reward for it, that’s what the trouble is. All of these changes, the transitions are quite costly.’ *Apple grower*.

In the Discourse of Money, humans are perceived as being able to move beyond nature through technological progress. This is similar to Dryzek’s (1997, p. 17) identification of a mechanistic, futuristic metaphor where ‘nature is like a machine that can be reassembled to better meet human needs’. It illustrates how this discourse distances itself from nature to make it easier to dismiss humans’ responsibility for looking after the environment. Despite dismissing the power of

the environment, some environmental processes are taken to be true and undisputable. For example, natural selection, competition, adaptation and survival of the fittest are accepted as fundamental natural processes. Humans are seen to excel in all of these areas and humans are regarded as the most successful species on the planet because of their ability to change the environment to suit them. This manipulation of nature is a mark of human progress and prowess and ability to rise above the rules of nature. Control, technology and development are valued in this discourse and there is a belief that climate change marks the end of an old-fashioned era and the start of a new time where the resource limitations of the Earth can be left behind. Nature will not be completely lost but can be managed, preserved and controlled by humans as required:

> Maybe there'll be other ways of manufacturing plastics, out of things that are grown instead. I just think that people will discover things and I think the farmer's got an absolutely central role in it all. Not necessarily going back to working in the paddock with a shovel, but there's going to be lots of things – biotechnology and different crops, different types of organisms – for producing things. *Dairy farmer*.

Humans are seen as fulfilling a natural evolution that takes us beyond or outside of nature (Bowman 2009). In this way, anthropogenic causes of climate change are perceived as evidence of humans' elevation to a state that has transcended nature and is now able to influence the Earth's global systems with science and technology. This belief creates the assumption that humans will eventually be able to manage the Earth as a system and control the climate.

Power in the Discourse of Money

Within discourse, power is intertwined with resistance (Foucault 1979) and is related to agency and the possibilities for action. In the Discourse of Money, wealth is powerful because it allows political influence and access to knowledge, as well as control over research, development and on-farm innovation. Power is perceived as coming from business endeavour, technological improvement and increased wealth and status. The Discourse of Money advocates the status quo in terms of capitalism, neo-liberalism and market choice and it regards any other

view as weak, idealistic and naïve. This discourse supports the status quo because there is a view that current paths are leading to further progress and improvement and that the systems leading toward a desirable technological future are already in place.

In the Discourse of Money, industry sponsorship of science and technology are perceived as important to develop better practices, to increase efficiency, create alternative energies and further industry knowledge. Modifications to plant and animal physiology, machinery and pesticides are all part of adapting to the effects of climate change, 'the work hasn't been done because it hasn't been needed but the reality is we'll be able to do almost anything with a plant or an animal.' *Dairy farmer.* Active support of science is seen to be important so that industry is involved in directing research to where it is most needed for maintaining and improving industry productivity and profitability. Therefore there is an exercise of political power in the way that this discourse supports science but the power is seen to lie with industry, not with scientists, because industry directs research and utilises the knowledge that science generates. Nevertheless, there is a need for industry to closely monitor the production of scientific research knowledge to make sure that it remains under industry control.

Another flow of power in this discourse is between industry and consumers. Although the agricultural industry is at the mercy of the consumers in many ways, and vulnerable to government penalties or restrictions, there are means of influencing these through clever market positioning, being innovative, and being part of a prominent and vocal industry presence. Clever business strategy creates beneficial positioning and increases power. The struggle for ideal market positioning creates tension between views about where the most advantage lies, in waiting to see how others respond, and capitalising on their mistakes or acting first to learn from the experience and create early advantages. In this way, making the right decisions is very important. 'You've gotta make sure that you make the right decisions.' *Apple grower.*

Box 9: Discourse of The Earth transcript excerpt.

Interviewer:	What do you think about climate change?
Apple grower:	Honestly, I think without doubt, we've impacted on our environment. There's no doubt about that. That's fundamental. The things around us aren't natural. We've gone and tweaked them and made some of nature's elements into what you see here, so we've impacted to some extent, but I don't think we've gone to the extent where it is the climate change bogie. I think it is cyclical, very much so. We're just going through a negative cycle. It is something that I was talking to some researchers years ago. Back in the early 1900s it was hotter and drier for a period looking at the hard data, and we only have records going back two hundred years at best in Australia. We're a young country. The planet we live on is bio-diverse and evolves constantly, it never stays the same. I think there is change, just to what extent we can control and manage it is a different concept.
Interviewer:	Have you seen any changes?
Apple grower:	Nothing specific. The reason it's interesting is because it's the weather. People say we used to be able to rely on the weather, well no, you can't. You can never rely on it to rain – one hundred mill was supposed to fall in October, it just won't happen; you just can't rely on it. They say it used to be reliable, no it wasn't, it never is. Nothing's really changed. We've just gone through these cycles of moving towards a drier period or moving towards a warmer period. Certainly, okay the last few years we've had frosts, we had one last week but that will come with the drier periods in the cycle.
Interviewer:	So you have a positive view about the future of the planet?
Apple grower:	I think so, okay we've got some problems with the man made effects we have on the planet. I still think they're small overall. I think Mother Nature has more of an impact and more of a control over a cyclic change that she manages. I still think it's going to be alright, it's not going to be doom and gloom. Wheels won't fall off.

In this excerpt, the apple grower demonstrates that their main concerns about climate change are environmental impact and natural living. Changes in the environment from climate change are perceived as being distinct, but are still seen as part of larger, cyclical processes of climate variability. Current historical records of climate changes are not long enough to provide sufficient evidence for a problematic change, and human efforts to influence the Earth's cycles are seen to be naïve and pointless. In the excerpt in Box 9, weather is described as unpredictable and unreliable and as a demonstration of how the Earth's processes are beyond human comprehension and control. The farmer is positive that the Earth is safe from human impacts and will be able to continue to evolve as it always has. Any human attempts to measure and control the environment so that it is stable and reliable will always be fooled. Managing the environment is only

possible for Mother Nature, who has introduced climate change as part of a natural, cyclical, balancing process, which occurs on an integrated level of complexity that humans cannot understand. Therefore, climate change is not accepted as anthropogenic because the Earth is too powerful to be influenced by humans.

This discourse is named the Discourse of The Earth because it focuses on the Earth and has a connection to 'Mother Nature' – a divine metaphorical personification that embodies creative and restorative power. While this discourse shows a concern for the negative effects on the environment that humans currently create, there is a belief that these are still too insignificant to have a real effect and that the world will continue unharmed. The above transcript excerpt encapsulates many of the themes included in the Discourse of The Earth. The categories in this discourse are: Category Eight, Faith, Category Nine, Mother Nature and Category Thirteen, Resource Limits. The strongest common element between these categories is concern for the Earth and an ultimate acceptance of the power of an external force in directing the future of the world. This discourse is fatalistic and can be apathetic or accepting, putting faith in a divine power. There is a dominant view that there is a need to respect the natural limits of nature, and not to deplete or spoil natural resources as much as is currently occurring. 'In the past we've done certain things that we think, *well that's not too good,* and we don't use them again. If I can see things that are having an effect, and I don't like it, we won't do it, we'll find something else.' *Apple grower.*

In the Discourse of The Earth, there is a sense that, because climate change is controlled by an external force, it might be part of a divine purpose and therefore not of any great concern. This view supports the notion that climate change may provoke natural evolution of humans and other species, or humans may be wiped out, but the Earth will endure, albeit in a different state. Climate change will be benign because the Earth will right itself naturally, balancing out anthropogenic impacts with subtle and diverse adjustments, or a new environment will be

created. Each of these solutions is seen to occur without any human action, other than gradual adaptation to a new environment.

Due to the belief that climate change is part of a natural cycle, adaptation to climate change is about on-going adjustments that individuals make based on their contextual experiences. Attempts to influence the Earth are pointless and, therefore, mitigation of climate change is rejected as impossible. 'I'm all for better efficiency. If we can tighten up on our fuel use and stop throwing stuff away, filling up land fill with our rubbish and stop flushing the toilet 18 times a day… then that's brilliant, but it's not going to solve it, so what we need to do is look at how to adapt to it.' *Agricultural consultant.* In this discourse, changing practices in order to be more environmentally responsible is desirable but such action is not considered mitigation.

Individual actions for sustainability are important in this discourse and it is important to encourage these in others. More sustainable actions might include turning lights off, having shorter showers, recycling, use of renewable energies, reduction in consumption and public re-connection with environmental values. These are considered irrelevant to climate change and instead are only about being properly respectful of nature and our use of natural resources. Therefore, these actions should be occurring anyway, even without climate change. 'The single most important element this debate has created, I believe, is awareness of our environment like never before and how precious it really is. If everyone actually started to appreciate and become aware of this fact, and acted positively in a small way, from walking where possible rather than driving etc., we, along with our planet, will be better off.' *Apple grower*.

The concept of different social winners and losers is not considered because the focus of this discourse is on a more divine or cosmic level of imagination, not on people. Climate change is usually regarded as part of a natural cycle and therefore anthropogenic climate change is doubted, or if seen to be occurring, it is with the knowledge and approval of a higher authority. In this way, climate change is

conflated with climate variability. Even if climate change represents a transformation of the whole climate system, this is part of variability and therefore a natural process that could change back, given enough time. ‘We don’t know what it would have been like if we didn’t do anything. No, I would say that it was warming up anyway would be my comment.’ *Dairy farmer.*

Locally in Tasmania, climate change is not expected to be any different from anywhere else, as everywhere experiences a warming cycle. ‘Venus and Mars are warming up too. They reckon sun spot activity could be contributing.’ *Dairy farmer.*

Typical language in this discourse is: natural order, integrated systems, healthy balance, shifts, cycles, cosmic effects, faith, virtue, dynamic systems, long time scales, natural effects (e.g. volcanoes, ice ages, extinction of the dinosaurs, sunspots) incomprehensibility, complexity, Mother Nature, the universe, God.

> Even if you put all the cow farts in the world together, and all the bloody leaky exhausts of poorly paid students together, and you have one eruption from a volcano which happens every bloody year somewhere, and that just dwarfs all that shit, so we tend to think that we’re the centre of the universe whereas we’ve grudgingly admitted that the Earth actually revolves around the sun and all that sort of stuff, rather than the whole solar system revolving around us. *Agricultural consultant.*

The Discourse of The Earth frames climate change as binary oppositions of: sustainability/change, acceptance/action, nature/technology, system/individual and observation/control. These language binaries limit thinking about opportunities for action because climate change is perceived as a natural system that is not able to be influenced by individuals or by technology and should therefore be accepted as normal or inevitable. Calls for urgent action in response to climate change are to be ignored. Attempts to explain, understand or control nature are seen to be naïve and pointless. Instead, actions to respect and honour the Earth should already be occurring and cannot be motivated by climate change.

Desirable farming practices in this discourse centre on concerns of respecting nature as much as possible. This discourse values balance, harmony, beauty, purity, complexity, interconnectivity, holistic thinking, time, respect and humility. Therefore, farmers' capacities to act to mitigate climate change are hindered because humans are not perceived as being able to influence the state of the planet. Climate change is seen as one aspect of 'the category of environmental insults deriving from industrial society' (Bulkeley 2000, p. 319). Equally important problems are degradation, pollution, extinction and the use of environmentally unfriendly products. While all of these problems are seen as undesirable and even immoral, they are not actually capable of affecting the equilibrium of the Earth. There is sufficient mystery and trust in the incomprehensible workings of the planet that human attempts to direct the future are naïve and inconsequential.

In the Discourse of The Earth, farming concerns focus on how to best respect nature and how to fit into the larger natural system most beneficially for all. These goals mean that soil dynamics, organic methods, cycles of nutrients, integrated pest management and so on, are key interests. This discourse is well informed about sustainable farming methods and potentially the best positioned to adapt to low emissions farming. Despite this, carbon dioxide emissions are seen as natural and therefore lowering carbon emissions as a goal of itself, is not an effective motivation for those farmers in this discourse. 'I really do believe anyone who's farming today is a conservationist because you've got to be.' *Apple grower*. This is similar to one of Vanclay's (2004, p. 214) social principles; 'farmers do not distinguish environmental issues from other farm management issues'.

In the Discourse of The Earth, the environment is regarded as something spiritual and awe-inspiring that needs to be protected and, where possible, left unchanged. Humans are perceived as destructive and incapable of understanding the complexity of nature; therefore managing nature for human purposes is selfish and likely to prove disastrous. The Earth should be left alone to run itself as much

as possible without interference. ‘If the Earth was just sitting there spinning away happily with no other outside influences, then you’d think that every year would be the same, so there must be other things that go on with the sun and beyond that influence things so it [climate change] could turn out to be something totally different – who knows?’ *Agricultural consultant.*

Views of nature in the Discourse of The Earth are similar to several metaphors identified by Dryzek (1997) where nature is seen to be a goddess or ascribed intelligence, or where nature is viewed as the grazing commons of a medieval village that belongs to no one and is therefore effectively looked after by none. In this discourse, however, the Earth is not fragile, although it is finite. Humans may damage many of its systems but the Earth is always capable of repair and renewal. Humans are currently a plague or sickness on the Earth, and are likely to face a reckoning much like the extinction of the dinosaurs. In this way, climate change is viewed as a deserved punishment or test for humans’ failing to properly value and look after nature.

Power in the Discourse of The Earth

Natural order, moral righteousness and spirituality are seen to be powerful because they are close to a divine truth and the purpose of human existence on Earth. Power is seen to come from nature and from living self-sufficiently on the land, supporting the dynamics of the natural system. This type of power is independent of the structures of society which humans have constructed for their own purposes, such as capitalism and politics, and which are not necessarily true reflections of life as it should be.

The Discourse of The Earth does not advocate the status quo because society must be changed in order to properly value the environment and the natural order. There is a view that current social structures are leading down a path to destruction and that immediate change to more sustainable life styles is essential. The cure for humans’ negative impact on the Earth is faith in nature in a quasi-

religious manner: ‘The Earthly paradise of a stationary state is attainable – but only if we recognise our sin and change our ways quite thoroughly’ (Dryzek 1997, p. 36).

Power in this discourse comes from the Earth and from the universe. Individuals cannot hope to have power but are stewards tending the Earth and supporting it. In this role humans can find peace, purpose and happiness but they are not considered to be any more valuable to the Earth system than any other species. This discourse rejects power as a concept that humans should wield, but those within this discourse can still enact significant power within society. People in this discourse are often adamant about their own particular practices, and are strong advocates for particular ways of farming and living. These are not without social influence and their particular values and practices may be highly sought after and profitable in niche or green markets. This discourse has the potential to influence others, particularly those in the Discourse of Money who are driven by financial and competitive concerns. ‘We believe that you need to be environmentally friendly, that’s where we make our money.’ *Apple grower*.

Discourse of Human Responsibility

Box 10: Discourse of Human Responsibility transcript excerpt.

Interviewer:	What do you think about climate change?
Apple grower:	It’s scary but it’s a reality.
Interviewer:	Why do you think it’s a reality? Why do you think it’s scary?
Apple grower:	It’s scary because some people still think it’s just the political talk, whereas in reality it’s not the political talk ... Those people who are saying it’s just political talk, they’re not preparing themselves for the challenges ahead and that’s why I put it that way that it’s scary. But for those who are actually embracing it and looking at the challenges and saying *let’s tackle the challenges* it’s not really a big challenge and it’s not scary for them because they are prepared for it.
Interviewer:	What can you do to embrace it and be prepared?
Apple grower:	Probably the first thing is for people to understand why climate change is a reality and look back and see what is happening and then once you have enough information, enough data to say *yes it’s happening* then you are more prepared to say, if someone comes to you and says, *no we can’t do this can we do something better to help the changes that are happening*, you are better off prepared than someone who has no idea what is going on.

In the transcript excerpt in Box 10, the apple grower focuses on social action. Climate change is accepted as a reality that needs to be addressed by people working together, communicating and embracing the challenge of change. This is seen to be an exciting opportunity for society to move forward. It is accepted that there is a need for information but that information is just a beginning step and that action is the most important point. Lack of action is expected to result in catastrophe and this provides even further motivation to take personal responsibility and start to act now. The excerpt demonstrates another fundamental difference in focus compared with the two discourses already discussed, placing people, instead of financial or environmental concerns, at the centre.

This discourse is named Human Responsibility because it is about the necessity of acting to address climate change and working together to share information, collaborate and be engaged, at individual and community levels. There is a strong need for agency and responsibility for action. The need to create a better future using social engagement and participation is a passionate motivation. Issues of the environment, poverty, human rights and the limitations of current social structures, are all targeted as necessary for immediate social action. The categories in the discourse of Human Responsibility are: Category Two, Action, Category Four, Responsibility, Category Five, People Power and Category Seven, Barriers to Action. These categories all share a strong sense of responsibility for action for the sake of humanity, now and for future generations. ‘We need to make adjustments to the way we’re living and farming and all aspects of our life and also to try and clean up some of the mess that we’ve made.’ *Apple grower*.

This discourse is fundamentally about the power created when people work together. Diversity, engagement, participation, collaboration, networks, leadership, energy, enthusiasm, passion and effort are all particularly valued. It uses language like: embrace the challenge, get involved, do your bit, take part, join in, create a new future, make a difference, together, share, for the children, for the future, community action, ground swell, grass roots, revolution and social

movement. ‘You need people from the community, from the industry, taking it up to government level.’ *Apple grower*.

The Discourse of Human Responsibility frames climate change as binaries of now/future, us/our children, change/catastrophe, participate/perish, divided/together, action/catastrophe. These language binaries limit thinking about opportunities for action. Action to prepare for climate change is perceived as urgent and essential for the current generation and the danger of inaction as catastrophic for future generations. There is a view that it is essential for people to work together and be involved if a solution is ever to be found, not just for climate change but also for the rest of society’s woes. Starting the process of working together towards a solution is the most important feature of this discourse. It is accepted that mistakes may be made but that it is imperative to start now. This discourse emphasises the potential for society to improve itself as the human race progresses and uses metaphors that depict seed planting, small children, tree roots, chains of influence and acting locally for a global influence.

The Discourse of Human Responsibility is about the possibilities for social transformation that people could achieve if they worked together. While there is ample potential for change, it is restrained by a lack of understanding or direction on which actions to take and how to instigate significant actions, which require broad social collaboration and participation. Therefore, in this discourse there is frustration because it is still limited to talking about and promoting action, or implementing small scale actions at the individual and local community levels. ‘When you sit back and think about it – yeah we are a bit concerned. But what can you do about it is the question you ask yourself: Turn off a few more light bulbs and stuff?’ *Apple grower*.

In this discourse, government processes are useful for legalisation to promote equal and fair action and to spread the ideas and responsibilities for change more widely. Government processes are trusted to implement changes once they have received the message from the public of the urgency for action. Despite trust in

government, governmental processes are recognised as slow, tedious and easily lost in red tape or rhetoric. Therefore, continual social engagement is essential to demand change and to speed up its implementation. Relying on governments to act without public involvement is seen as leading to undesirable outcomes that are impractical and will only benefit big companies, without properly accounting for important social considerations. Therefore, being proactive and leading government to make the right decisions is important. 'You want people to take initiative first and then push the government to do something about it.' *Apple grower.*

The same level of involvement in government processes is required at an industry level and it is important for industries to have a say in the decisions that will affect them: 'We're lucky in the dairy industry because it's a proactive industry.' *Dairy farmer.* In both the Discourse of Human Responsibility and the Discourse of Money, industry involvement in government decision making processes is important. In the Discourse of Money, people are motivated by a need to maximise industry power whereas in the Discourse of Human Responsibility motivation comes from maximising social and democratic power and action.

Higher levels of social engagement are also required to change social infrastructure including education systems, consumption habits, supermarket monopolies, industry procedures, work hours, public transport and the media. All of these structures are created by and for people, yet they are now having negative effects as well as positive ones and they need to be changed with social action. 'The market is us who go out into the supermarket and buy … it's the consumers that say this is what we want, any produce that we buy – this is what we want.' *Apple grower.*

As the Discourse of Human Responsibility encompasses a broad scope of issues to address, climate change is only one factor among many reasons for action. Climate change is, however, regarded as an issue of particular concern because it combines many problems, exacerbates existing problems and highlights how

broad scale transformations of society are desperately needed. At the same time, the required level of transformation seems beyond individuals acting alone because it requires public demand and then strong leadership for social action. 'I think it's down to the new US president. If the US president has the courage to take matters to their proper conclusion he will force a major change in the use of energy. But it can't be a government expense; it's going to have to be people paying. It's going to be a painful but necessary lot of adjustments.' *Agricultural consultant.*

Climate change action is an emblematic issue that represents multiple concerns including over-population, over-consumption, starvation, deforestation, pollution, peak oil, economic and political unrest and so on. These concerns all threaten the future of humanity and urgent action is needed. 'I see climate change causing a lot of suffering to people world-wide. Shortages of food, people getting hungrier, that's what I see. It's already happening, there's drought everywhere, not enough food to feed people and food getting more expensive every day. It's really a big worry.' *Apple grower*.

Although this discourse is largely positive about the efficacy of action, it is also motivated by a deep fear of catastrophe if actions are not adequate and timely. 'The thing about climate is, if we don't get it right now, I've got kids, 18, 15, 12, 10, we've got to get it right now for them otherwise we're going to be knackered.' *Dairy farmer*.

The Discourse of Human Responsibility is characterised by positive engagement with problems but it is in danger of being overwhelmed, because it frames problems on such a grand scale and in such an integrated way. Climate change affects everyone and everything and therefore the future looks bleak. 'I see a lot of demographic changes, if we're talking about the impact of global warming creating very large changes, drastic changes, I see people moving inward because of rising sea levels, increased population in urban areas, creating more problems.' *Agricultural consultant*.

In this discourse, everyone focuses on doing their part, no matter how small, so there is the possibility of being part of creating something wonderful for the future. There is a sense that it is too late for this generation to experience the benefits of the new world that needs to be created but it is possible to start building towards a more harmonious and equitable world for future generations. 'If people could embrace it and the big corporate companies embrace it and there's funding to do all the efforts that people are trying to put together, yes things might change, not for our generation but the next generation.' *Apple grower.*

While there is a concern that individual actions are not sufficient to make a difference, there is a recognition that each person needs to do what they can. 'As an individual I think we are ruining our planet for our kids of the future. As an individual I feel, what can I do? Should I just look after my little patch here and try and do the best I can, and that's probably the way that I have tried to do it.' *Dairy farmer*.

Equity is an important issue, as individuals need to work together and contribute their special skills if the problems in the world are to be overcome. 'It's like I milk cows, that's all I do, that's my best job, you do research, get in there and do the best you can, that's all you can do and if we all work together we can try and get something.' *Dairy farmer.* In this discourse, equity means that each person should act as much as they can, rather than everyone doing the same amount. It is recognised that a diversity of actions and actions related to local contexts is essential if everyone is to play their part in creating social change. Therefore, it is not important that the causes of climate change have been unequally produced – everyone now shares the moral obligation to act, regardless of how much they have contributed to the problem. Acting as much as possible means that developed countries, including Australia, are required to take a leadership role and look after other countries that might be more negatively affected by climate change.

Locally, climate change is an opportunity for engagement, leadership and agency in promoting action by creating new community groups and leading others in demanding action at government levels. 'I'm only one individual, [out] of 20 million in Australia, if I do something it won't have any effect but if 20 million people do it, [then it will have an effect], and that's the argument we take to the rest of the world.' *Climate scientist*. From an international perspective, climate change strengthens a belief in the importance of supporting other social efforts, including alleviating poverty, sharing knowledge and achieving better standards in health, education and care for the environment.

In the Discourse of Human Responsibility, farmers have a special role to play in supporting the future of the world. Farming concerns centre on responsibilities for producing food, reducing negative environmental impacts and preparing for the next generation to take over the farm. The world is perceived as becoming increasingly difficult for farmers and increasingly dangerous and volatile in general, yet farmers are seen to be among the most essential people now and into the future, because of rising demands for food production and environmental stewardship. There is a strong desire in this discourse to protect and promote farming for the next generation, even though there is a concern that it will be a more difficult job in the future. 'I think we're probably safer than the next generation's going to be as far as climate change goes. I think what we have to deal with and what they might have to deal with in 30-50 years time might be scary.' *Dairy farmer*.

Anthropogenic climate change may be generally accepted as the cause of climate change in this discourse but it is not a defining feature of Human Responsibility. The focus of this discourse is on engaging with other people to create a better world and therefore people's motivation can come from many sources, not limited to the environment or to climate change but including gender equity, poverty alleviation, promotion of local businesses and so on. Community engagement and involvement are still positive reasons to support change, even if anthropogenic causes of climate change are not accepted. 'I think we've got to

get back into communities. If we all ate out of the garden and ate locally we'd do a lot better.' *Dairy farmer*.

People in this discourse can experience positive outcomes, even when targeted objectives are not achieved. Forming closer relationships with local communities and being involved with a diverse range of people brings enjoyment to many, regardless of the end result.

Power in the Discourse of Human Responsibility

In the Discourse of Human Responsibility, humanity, the idea of the whole as greater than its parts and building for the future are seen to be powerful, because they capture an infinite capacity to work together for future generations. It does not advocate maintaining the status quo. Instead, society must be changed in order to reconnect with essential human values and capabilities of collaboration and equity. As in the Discourse of The Earth, there is a view that current social structures are on a path to destruction and immediate change is essential, however, unlike the focus on the environment that the Discourse of The Earth demands, the changes that this discourse requires are focused on people and about empowering local communities for action.

Power in this discourse is generated by humanity and is seen to come from within individuals and to be greatest when many act together. There is power in communities and democratic processes and in governments that are in touch with their constituents or acting together with other nations. There is an emphasis on power needing to flow from the bottom up, although de-centralised power can lack leadership and result in the actions becoming unfocused or lost in debate. Creating a balance between democracy and leadership is an unresolved tension of this discourse.

Science and technology is trusted as providing one part of the solution but multiple other parts are also recognised as being important and science does not

have a monopoly on climate change solutions. Science is seen as limited and slow and while technological innovations to combat climate change would be welcomed by those in this discourse, quick fixes are treated sceptically and cautiously. The fundamental goal advocated in the Discourse of Human Responsibility is wide scale social change, which is seen as possible only if people demand change. Science and technology are regarded as distracting from the real issues of change, which are finally being rediscovered by many people. These issues are a reconnection with wholesome values, purpose and happiness found through rediscovering connections with other people, family, community and engagement in the processes of democracy.

Discourse of Questioning

Box 11: Discourse of Questioning transcript excerpt.

Interviewer:	So what do you think about climate change?
Dairy farmer A:	Someone's making a lot of money out of it, heaps of money. Look I don't know, to be honest with you. If the globe wasn't warming, we'd be still in the Ice Age. How many years since the Ice Age? It's been getting warmer hasn't it? Otherwise we'd be still in the Ice Age.
Dairy farmer B:	But as to whether the carbon emissions and all that sort of stuff has got a huge amount to do with it, I think it's just all a storm in a tea cup.
Dairy farmer A:	But we put a lot more pressure on resources and that's got to have an effect somewhere. Whether it comes out in CO_2 emissions, I don't know.
Interviewer:	Where do you hear about it?
Dairy farmer B:	We go to dairy conferences.
Dairy farmer A:	The last Tasmanian conference they had a bit on it and how it is going to impact on the dairy industry.
Interviewer:	What did they say about it?
Dairy farmer A:	No one really knows, like the cost of credits and how it's going to apply to us. There's so much variability out there at the moment.
Interviewer:	Are you worried about that?
Dairy farmer A:	I am to a point because it's as much politically driven as it is science driven, I think. That's a worry. When politicians and probably one eyed scientists – how independent is it?
Dairy farmer B:	Because their wages come from that particular thing. They're getting their funding from the whole system, why wouldn't you be a bit more biased on one side?

In the excerpt in Box 11, the two dairy farmers describe how different and contradictory constructions of climate change create confusion and raise multiple questions about what climate change really is, who is behind it and what impacts it will have on farming. The farmers focus on the uncertainty and conclude that a

lack of reliable information means that it is impossible to trust the scientists and politicians who have vested interests in producing particular types of information. Climate change is too complex to be properly comprehended without more credible sources of information, or special training in climate science, both of which are not at all practical for these farmers to procure. On one level, climate change is constructed as a new problem relating to carbon dioxide emissions but this is seen to be simplistic and about generating media hype for the personal benefit of scientists, the media or politicians. Therefore, the more meaningful construction of climate change as an issue of how humans affect the environment in negative ways is being distorted and forgotten.

This discourse is named Discourse of Questioning because it focuses on how information is framed in different ways creating problems with trust, which in turn raises questions about every aspect of climate change. Key concerns are uncertainty, bias, complexity and truth. The categories that make up the discourse of Information are: Category Six, Waiting for Knowledge, Category Eleven, Confusion and Category Twelve, Distrust and Scepticism. Confusion and doubt are features of all of these categories and are therefore central to the Discourse of Questioning. ‘My personal belief, I don’t know. Even as a scientist I haven’t delved down deep enough into the greenhouse gases that are driving the warmer climate. What effect does water vapour have on it? I don’t understand it so I’m not willing to make a comment.’ *Agricultural consultant*.

The Discourse of Questioning values evidence, written records, historical knowledge, personal experience, observations, certainty, credibility, objectivity, impartiality, intellectual engagement, rationality, knowledge, proof, critique, replicable science, explicit assumptions and rigour. ‘It’s such a large, complex, multifaceted issue. It’s a change to the entire Earth’s climate system which is such a large and complex thing to start with and then detecting and attributing changes to that is another large, complex issue.’ *Climate scientist.*

In the Discourse of Questioning, typical language includes: Fact, controversy, spin, hype, uncertainty, unreliability, complexity, confusion, bias, vested interests, debate, belief, doubt, not having all the information, indecision, Y2K, truth and trust. 'Even in the science community, you get believers and non-believers, even if there's facts and figures staring them in the face, so if they can't be persuaded, how can the average person, who's done none of this research, it's only what they pick up from the media and the media can portray anything how they want.' *Climate scientist.*

Binaries in the Discourse of Questioning are: distrust/trust, incapacity/empowerment, individual/collective, truth/controversy, fact/hype, truth/lies, right/wrong. These language binaries limit thinking about opportunities for action because climate change is perceived as doubtful and as biased by different vested interests. In this discourse it is especially important for the facts about climate change to be properly identified and validated before any rash decisions or actions are made or forced upon farmers. Trust in the truth of information and the transparency of knowledge production is most important for those in this discourse, and it is not yet accepted that the issue of climate change is able to be trusted.

Vested interests are seen as likely to exaggerate climate change and while there is probably some element of truth in claims of how humans cause negative environmental impacts, to what level or how these are best addressed is still unknown and unable to be accepted until the emotional hype has subsided. 'It's hard to get information because there's so much stuff out there and a lot of it seems to be self generating. To me, a lot of it doesn't appear to be based on facts it seems to be based on hype so it feeds on itself and gets out of control. People don't refer to the facts they seem to refer to the hype of it all, it's all built itself.' *Apple grower*.

In the Discourse of Questioning, vested interests have to be measured and accounted for. Climate change is especially complex because there are vested

interests from multiple sources, including government, scientists, the media and other groups making money out of climate change. Vested interests are particularly problematic in this discourse because they cloud the truth and need to be carefully examined, measured and accounted for. In terms of climate change, vested interests are still unclear and therefore the truth about climate change is still clouded by ulterior motives. 'Obviously it's good not to pollute, I'm all for cutting out the gases but I'm a bit suspect about this carbon trading scheme. I'm into conspiracy theories. I think Al Gore is setting up a new stock market and going to be king pin, claiming his commission on every carbon tax that goes through.' *Apple grower*.

There are concerns about action taken to address climate change in the Discourse of Questioning because, if the issue is not yet fully understood and the vested interests not yet accounted for, then action is seen to be hasty, irresponsible and misinformed. Action is supporting those who are promoting climate change for their own ends. Just as occurred with the millennium bug phenomenon – Y2K – where many farmers spent a great deal of money preparing for an eventuality that never occurred, there are concerns that actions to prepare for climate change will be similarly expensive and for nothing. There are concerns that government programs to organise action to combat climate change will be very expensive and in the end, likely to come to nothing. 'The jury's still out, it's not to say that we're not worried about it but there's only so much we can do and we do what we can do, what else can we do?' *Dairy farmer*.

A feature of this discourse is that media reports cannot be trusted and need critical evaluation which requires specialist knowledge. Without this evaluation, media reports of controversy remain a significant concern. 'I'm not a scientist. I can only make comment on what I read in the media or see on the television. Clearly there's some influence from carbon dioxide in the atmosphere creating a warming effect. It depends. That's the hype side of the media, if you actually delve into some of the scientific stuff, there's counter arguments to all of that.' *Apple grower*.

In the Discourse of Questioning, climate is only knowable through the historical records of temperature and rainfall. ‘The figures on paper are the only things that you can look at, history is there and it’s recorded.’ *Dairy farmer.* Climate change is too complex to be properly understood and so whether or not it is anthropogenic is too difficult to discern. Anthropogenic climate change is accepted as a possibility that, if true, would have disastrous consequences that are likely to be unavoidable because by the time there is certainty and information about how to usefully act, it would be too late. Distrust and uncertainty about climate change information creates denial and avoidance. Everything is arguable and contested. Information is likely to be too confusing, too complex, too distant, too tainted, or too difficult to understand. ‘I like to see facts. You like to see it on paper. I’ve sort of slipped back a bit from being a true believer to maybe it is a cycle.’ *Agricultural consultant.*

In this discourse, further attempts to engage with sourcing more information, talking about the issue or thinking reflexively about it are avoided until such a time that the answer is sufficiently clear and simple and better still, legitimated by a respected expert. This involves waiting for others to synthesise the information and come up with a position that is widely accepted and supported. At the moment the most easily adopted positions are either total rejection or indecision. ‘Is it happening, is it man-made? All these questions, I don’t know, the experts don’t know.’ *Apple grower.*

The local impacts of climate change are important in this discourse as an example of how there is not yet enough information about climate change to make objective, rational decisions about action. Local information is not available, or not able to be connected to global models and reports, therefore, relevant and useable information at the local level is still unavailable, or uncertain. ‘Here on a local level our winter rainfall patterns have changed quite dramatically over the last few years, now whether that’s part of a natural cycle or not it’s hard to tell because we haven’t got rainfall records for 300 years.’ *Agricultural consultant.*

Desirable farming practices in this discourse centre on intelligently making decisions based on access to good information. It takes skill to adapt knowledge and technology to production systems, local contexts and so on. Farmers' capacities to act to address change are hindered because climate change is too uncertain to be actionable, information too controversial to be trusted and suggested changes often too radical to be sensible. Trust in who creates climate change knowledge and how information relates to individual contexts, people and place is a particularly important issue. 'I mean there's the thing about the global warming but it's hard to know what's really happening when we've just had a cold winter and everything we believe says we shouldn't have had a cold winter, so I don't know.' *Apple grower*.

A concern of those located in this discourse is that there is no information about climate change applicable for local farming issues. Therefore, rather than acting rashly, it is best to do nothing. Farmers are seen to be positioned best if they are aware of what others are doing and receiving information but are not yet acting. 'They're interested but I wouldn't say they're adapting and I think that's probably the right approach too.' *Agricultural consultant.*

The environment in this discourse is seen as a complex and integrated entity that humans can study and learn about but are unlikely to ever fully understand. Actions taken are often in response to an external vested interest, including government policy and regulation, promoting action rather than to address primarily environmental concerns. 'When you go across to China, it's just absolutely appalling, it's a wonder the whole world's not choked when you see the visible pollution and the lack of environmental controls in that country.' *Apple grower*.

Science is potentially the saviour of humanity in the Discourse of Questioning because science produces evidence of truth. Paradoxically, science has vested interests and in some situations is fallible and limited. A defining characteristic of the Discourse of Questioning is the desire to have complete faith in science and

the presentation of the ideal of science as truth provider. Yet, sometimes this ideal is shattered by scientists acting to further their own careers and spreading misinformation, instead of promoting objective science. Climate arguments between scientists are viewed as evidence that there is controversy and doubt still surrounding climate change. 'Because science is so linked to funding and scientists instead of being people who were once called upon to give evidence in court and held up in high esteem are now people who will sell anything and talk any crap to get the next lot of funding.' *Agricultural consultant.*

Evaluating who has credibility and who to trust can take up more time than evaluating the information itself and even commonly accepted points may still be contested by those in this discourse. 'When you look at the data there, CO_2 levels follows climate changes quite well but the actual understanding of how that affects temperature changes, I don't understand it.' *Agricultural consultant.*

In this discourse it is assumed that life will be better in the future because progress is continual and incremental. 'I suppose we feel at the moment there's going to be an opportunity to see what happens when they roll out the 2010 first lot and probably give us an early warning of the way things are going to be.' *Dairy farmer*.

Power in the Discourse of Questioning

In the Discourse of Questioning, power is created through knowledge and truth. Those in the discourse recognise that partial information can be dangerously misleading and that different frames of information can create bias. Objectivity is important to achieve by maintaining balance, critical evaluation and a scientifically sceptical attitude. Science and technology are a mixture of trusted knowledge and contested knowledge, with some scientists regarded as trustworthy while others have sold out to vested interests. Money is blamed for biasing information and the way governments, scientists and others are making money out of climate change is regarded as especially disgusting in this

discourse. The media is blamed for reducing the purity of science by distorting information and creating controversy through promoting particular scientists, often those with a vested interest in a particular view.

This discourse is the least empowered of the four found in this research because those in this discourse are not likely to feel empowered to produce knowledge. Consequently external parties, particularly scientists, must be relied on for truth and are frequently regarded as being untrustworthy. The discourse does not realise its potential to become powerful by creating its own information and trusted knowledge.

Overlaps and conflicts

The four discourses are distinct and different, yet there are also overlaps and conflicts between them. Overlaps and conflicts in discourses relate to resistance and are particularly useful to consider in terms of transforming discourse to improve farmers' agency to act to address climate change.

An overlap between the Discourse of Money and the Discourse of The Earth is confidence in the future. In the Earth discourse, this is motivated by faith in a higher power and acceptance of the outcomes that are ordained, rather than a faith in science and development, as in the Discourse of Money. Another overlap between the two discourses is the rejection of the individual as being responsible for causing climate change and therefore rejection of the moral imperative to act, although the Discourse of The Earth does promote a moral imperative to look after nature and live sustainably.

There is a major conflict between the Discourse of The Earth and the Discourse of Money in the value placed on the environment and even in its very presence. In the Discourse of Money, the environment is largely absent from consideration, except where the environment relates specifically to supporting the generation of wealth. In the Discourse of Money, humans are privileged as having progressed,

or at least being on the path to progressing, past a reliance on nature to where humans can control and manage nature. In the Discourse of The Earth, the view that humans have progressed beyond any interdependence with nature, or that they are ever capable of doing so, is rejected. There is no trust in technology to overcome all problems, because humans cannot hope to control the forces that direct the Earth. In this way, individuals, and even the whole of humanity, greatly overstate their sense of importance and ability to change the universe in the Discourse of The Earth.

In the Discourse of Human Responsibility and the Discourse of Money there is a connection in the view that humans are more powerful than the Earth. In the Discourse of Human Responsibility, however, this power is not perceived as positive, as it is in the Discourse of Money as human progress or omnipotence. In the Discourse of Human Responsibility, this power is perceived with a fear that society has lost touch with important values and the fundamental aspects of being human.

Another overlap between the Discourse of Human Responsibility and the Discourse of Money is a strong focus on the importance of equity. In the Discourse of Money, equity is motivated by a need to maintain industry competitiveness and is generally advocated more by those without great status or wealth, while in the Discourse of Human Responsibility, equity is about everyone participating as much as they can for the benefit of future generations.

Although the Discourse of The Earth and the Discourse of Human Responsibility feature similar essential human values about recognising and valuing humanity's connection with the Earth, there is a difference. In the Discourse of Human Responsibility, these values are about connecting with each other in social networks and ensuring the sustainability of the environment in order to support future generations, rather than about connecting with a spiritual presence of the Earth. The contrasting view in the Discourse of The Earth is about sustainability of the environment by itself, even without humans.

There is an overlap between the Discourse of Questioning and the Discourse of Money because both emphasise the need to wait before acting and in both there is a reliance on the development of new technologies to make the required changes easier. In the Discourse of Money, waiting is motivated by first seeing how competitors act and technology is trusted as the way to improve productivity and profitability. In the Discourse of Questioning, however, waiting is motivated because actions are expected to be easier and more sensible in the future, once science and society have produced more knowledge. A conflict between the Discourse of Questioning and the Discourse of Money occurs because the Discourse of Questioning emphasises the development of scientific understanding as the necessary path to a successful future. In the Discourse of Money, science is regarded as useful for providing the technologies required for society to progress, however science is also distrusted and instead, the power of economics is promoted as the most beneficial way of supporting industry interests.

The Discourse of Questioning connects with the Discourse of Human Responsibility because in both, the possibility that climate change may be catastrophic is accepted. For those in the Discourse of Human Responsibility, collective action and individual involvement can combat the sense of disempowerment associated with the urgency of dealing with climate change. In the Discourse of Questioning, people are comforted by the belief that any devastating impacts will not occur until beyond their lifetime. The Discourse of Questioning is less emotional and more rational than the Discourse of Human Responsibility and those in this discourse are generally less susceptible to panic.

The Discourse of The Earth and the Discourse of Questioning overlap because of a shared assumption that the Earth and its systems are incomprehensible to humans. In this way, people embedded in these discourses share a faith in an external authority to chart the future.

Table 5: Summary of the four discourses.

	Money	**Earth**	**Human Responsibility**	**Questioning**
Nature	Resource to be monitored, controlled and maximised.	Gift be left untouched and respected.	Process that is fragile and needs protection.	External entity, not (ever) fully understood.
Sustainability	Continuing productivity and profit.	Preserving the purity of nature.	Protecting nature for future generations.	Continuing development and knowledge.
Responsibility	Government, corporations, industry bodies, consumers.	Mother Nature, God, cosmos.	All people equally, for future generations.	Future generations when more is known.
Science	Complex, needs translation.	Often irrelevant.	Trusted expert.	Contested but valued.
Other issues e.g. terrorism, financial crisis.	Increases impacts and opportunities for business.	Shows failure to respect nature.	Shows need for social transformation.	Adds complexity to how information is understood.
Climate	Expected conditions for production.	Natural cycles.	Average weather.	Historical records.
Global climate change	Business risk, financial burden.	Natural event.	Emblem for change.	Not yet understood.
Farming	Rewards for hard work.	Life close to nature.	Providing an essential service.	Skilful application of knowledge.
Climate change in Tasmania	Sheltered from extremes, less affected than elsewhere.	No different to anywhere else.	A particular opportunity for leadership, to set an example.	Not enough specific information known.

It is notable that climate change is only one of many environmental and lifestyle issues in all of the discourses, despite it being the focus of the interview. Each of the discourses described above demonstrates how climate change was not necessarily a definite or singular issue for many farmers at the time of interviews. No one farmer was located within a single discourse and each discourse is not only about climate change. The discourses reflect farmers' broader cultural perspectives and are probably representative of their discourses of other issues as well, such as ideas about climate, sustainability, productivity, farming and what makes a successful farmer. These ideas are summarised in Table 5 in order to demonstrate the key differences between how each discourse constructs these other issues.

Making connections

The production of the four farmer discourses in this chapter was informed by other accounts of discourses and myths in the wider literature on the environment, and the deficiencies in the discourses constructed from a critical reading of the literature on climate change discussed in Chapter Two. These were described as logical action, complexity and culture.

The Discourse of Money overlaps with the discourse of logical action because action is assumed to occur when it is sensible and when it becomes apparent exactly how to act. Resistance is therefore logical if information is not sufficiently clear or persuasive, or if farmers themselves do not feel they have the capacity to act, particularly the financial capacity. Action will logically occur when rationales are supported by evidence, mandated and subsidised by government and more clearly communicated by those with the responsibility to promote action on climate change, such as policy makers and extension workers. Therefore, resistance to hasty and unproven actions is seen to be logical in the Discourse of Money.

The Discourse of The Earth is informed by the discourse of culture because change to a more environmentally friendly society is thought to occur only through broad social and cultural changes. In the Discourse of The Earth, however, there is cynicism about the possibility of such a cultural shift, although such a shift would be desirable. There is a view that a flawed culture, which does not properly value the environment, is the fundamental reason why society is facing so many problems. It is also the reason why nature has ultimate control, because humans are incapable of properly balancing the complex systems of the Earth.

The Discourse of Human Responsibility is similarly informed by the discourse of culture, because those in this discourse also advocate the need for broad social change. This discourse attributes the many problems it hopes to address through social change to a problem with culture, diminishing cultural values and a lack of equity within and between current cultures. In the Discourse of The Earth, the cultural changes required are believed to be possible, unlike in the Discourse of Human Responsibility. Whether cultural changes occur quickly enough is another matter, however, as the problems this discourse identifies are numerous, complex and sizeable. Both are idealistic with a major agenda for change.

The Discourse of Questioning is informed by the discourse of complexity, as both focus on the disabling effects of complex or incomplete knowledge and the impossibility of action when there is confusion or distrust. The Discourse of Questioning advocates the need for more knowledge and constructs the view that perfect knowledge is attainable. Action in response to climate change can only be successful when knowledge is definite, clear and uncontested, however unlikely this may be, considering the vast complexities involved and perpetuated by the discourse of complexity.

The discourses share similarities and overlaps with each other and with various discourses and myths described in other research. The most pronounced of these are between the farmers' discourses: Money, the Earth, Human Responsibility

and Questioning; and the cultural myths of nature that Douglas (1992) describes as; robust, robust within limits, capricious, and fragile. These were introduced in Chapter Two, where the similarity of the farmers' discourses and Douglas' (1992) myths of nature can be considered reflective of how the discourses have developed over time. It also demonstrates how the farmers interviewed related climate change to other issues by responding in ways consistent with their already established view of the world.

A robust view of nature encourages 'bold, individualistic experimentation, expansion and technological development' (Douglas 1992, p. 263). This connects with the Discourse of Money and its emphasis on personal advantage, profitability and lack of concern for the natural environment.

In the Discourse of The Earth and Douglas' (1992) myth that nature is capricious, nature is viewed as being unpredictable and attempts to try to influence it are futile. The Discourse of Human Responsibility connects with Douglas' (1992) cultural myth of nature where nature is perceived as fragile and needing to be protected.

The Discourse of Questioning shares similarities with the cultural myth of nature as 'robust within limits' (Douglas 1992, p. 262). Nature is seen to be resilient to human impacts, but only to a finite level. In the Discourse of Questioning, whilst humans are not currently pushing nature beyond the brink, it is feasible that this threshold is fast approaching. Climate change is potentially a sign that there are natural limits to what nature can endure from humans, but the idea is still questionable and not definite, remaining an unproven hypothesis.

Other literature also has connections with the four discourses constructed in this research, although not as consistently as Douglas (1992). The need for a return to a simpler, more agrarian way of life in the Discourse of The Earth connects with the myth of Eden that Hulme (2009, p. 358) describes as communicating a 'desire to return to some simpler era'. There are also connections with Lovelock's (1979)

Gaia hypothesis, of an omniscient force controlling the Earth. This is similar to Dryzek's (1997) discussion of the metaphor of nature as a sentient being or a goddess, capable of thought, strategy and retribution. Dryzek (1997) discusses how humans can be considered to be a plague on the Earth or a cancerous sickness that needs to be excised for the Earth to regain a healthy symbiosis. If humans are capable of having a significant negative effect on the Earth, this will be addressed by the environment adjusting to create or regain balance. Dryzek's (1997) discourse of green radicalism, where it is believed that society must be changed to privilege the environment, also connects with the Discourse of The Earth.

Similarly, Hulme's (2009) myths connect to the other discourses. The myth of Jubilee relates 'the inescapable call for humans to respond to injustice' and the myth of Apocalypse relates 'our worry about the future' (Hulme 2009, p. 358). Both connect with the Human Responsibility discourse because of the focus on equity and the moral imperative for humans to take action, to prevent the ultimate catastrophe that climate change is perceived to represent. There is a shared concern that issues of justice and the ability to avert catastrophe cannot be adequately addressed by humans. The Discourse of Questioning has similarities to the myth that Hulme (2009) describes as the myth of Babel, where climate is an aspect of nature that requires human management and control.

Bäckstrand and Lövbrand's (2007) civic environmentalism discourse, introduced in Chapter Two, has connections with the Human Responsibility discourse. The civic environmentalism discourse disputes the power regimes of these structures and advocates more of a bottom-up approach, whereby currently institutionalised social inequalities are challenged and restructured (Bäckstrand & Lövbrand 2007). Climate change is located within the larger issues of ecological sustainability and equality and civic environmentalism therefore seeks to address multiple issues by addressing climate change. While Bäckstrand and Lövbrand (2007) define two branches of civic environmentalism, they both centre on

increased participation and scepticism of solely top-down solutions, a notion shared with the Discourse of Human Responsibility.

The Discourse of Questioning is similar to the tragedy of the commons concept attributed to Hardin (1968), because it is understood that everyone relies on nature and uses it as a shared resource, yet no one will take responsibility to save it. This explains the sense of unavoidable tragedy that is an important characteristic of the Discourse of Questioning, because even though it is accepted that someone should take responsibility, questions over who, how and how much, are seen as impossible to answer and therefore the issue remains unresolved and unsolvable.

There are also some general similarities between the Money, Earth, Human Responsibility and Questioning discourses of this research and Curry's (2008) work on views of climate change and theology. Curry (2008) focuses on Christian religious perspectives and their influences on world views about what the future is expected to be like; how nature, humans and God are integrated; and responsibility for social change. Specific or overt religious perspectives were not examined in this research, therefore more connections between Curry's (2008) findings and the discourses described in this chapter, cannot be made, however this may be an interesting area to examine in further research.

Conclusion

The four discourses represent different and distinct views of climate change that still overlap in some ways. In the Discourse of Money, climate change is an economic threat and best addressed through current economic mechanisms. In the Discourse of The Earth, climate change is a natural cycle and is best addressed through adaptation although more sustainable and respectful living is also desirable. In the Discourse of Human Responsibility, climate change is an emblematic issue of social problems that must be addressed by all people working together. In the Discourse of Questioning, climate change is an uncertain issue where everything is contested and all factual information is potentially

biased. This last discourse is the only one without a definite view on the nature of, or need for, action. The need to create better, clearer information is seen to be essential before any other steps can be taken.

Each of the four discourses constructed from the analysis has a connection with the discourses described from the literature in Chapter Two. The Discourse of Money shares connections with the discourse of logical action because action on climate change is not seen to be sensible in terms of creating a cost benefit or competitive business advantage. In the Discourse of The Earth and the Discourse of Human Responsibility there is a shared connection with the discourse of culture. The problems with society, of which climate change is one particularly emblematic example, are created by culture and can only be addressed by a total change in social structure. In the Discourse of Questioning there are connections with the discourse of complexity because confusion and complexity of information create a paralysis and rejection of action.

These four discourses are not comprehensive accounts of farmers' perceptions of climate change and are contextually and temporally located. Therefore, there are possibly other discourses of climate change not described here, or these discourses may be present, in different forms, in other social contexts. Nevertheless, these discourses demonstrate that there are multiple and conflicting views of climate change and these different views promote different forms of action and create different forms of resistance. If these different views are better understood, behaviour change can be far more effectively facilitated.

Multiple alternative discourses and widespread awareness and critical engagement with alternative views of climate change is an important way forward for increasing agency and farmers' possible actions. None of the four discourses discussed above are sufficient to promote every action to address climate change. In order to improve farmers' capacities to act in response to climate change, awareness of the possibilities and limitations of these four discourses, as well as opportunities to create new discourses of climate change is

needed. New discourses are especially likely to emerge from awareness of the current absences and limitations of current discourses and with new words and uses of language. In the next chapter, the practical applications of these four discourses are discussed and ways forward for both extension and policy outlined.

CHAPTER 6

Moving towards agency: applications for extension and policy

It is the aim of this research to improve farmers' possibilities for agency and action through an improved knowledge of farmers' discourses. Understanding discourse and resistance can increase awareness of the limitations of farmers' current subject positions and may improve farmers' abilities to act in response to climate change.

While farmers themselves are not the intended audience of this thesis, they are the intended beneficiaries. If extension and policy workers make greater connections between discourse theory, critical literacy and extension, it can help to empower farmers, transform subjectivities and increase their power and agency.

Resistance is created by discourses limiting possible options for behaviour. Understanding discourse and resistance is a way of increasing agency and change. It allows the limitations of discourses to become more apparent and creates opportunity for transformation. This understanding of resistance is aligned with other literature that strongly refutes the deficit model, (Moser & Dilling 2007; Potter and Oster 2008; Vanclay & Lawrence 1995a). In the deficit model, resistance is seen to be the fault of individuals, because they lack skill, resources or information. Although it may be important to improve the skill level and income of farmers, it is more important to examine the social reasons for behaviour rather than individuals' personal reasons for resisting behaviour change. An examination of the social and cultural backgrounds which inform the discourses of farmers is largely ignored in current applied agricultural research.

The failure to adequately acknowledge discourse has implications for the possibilities of social action on climate change.

This research sought to provide a discursive exploration of the social reasons farmers might reject practice changes for climate change. This chapter seeks to provide new insights for extension theory and practice to facilitate change for farmers operating in a changing climate. For advisers at all levels, from on-farm to high level government policy, it aims to demonstrate how changes in farming practice to manage climate change might be better facilitated.

The four discourses described earlier show that farmers' understandings of climate change can be constructed around issues of Money, of the Earth, of Human Responsibility and of Questioning. Within these four discourses, Tasmanian farmers construct different approaches to action in response to climate change. This chapter considers the implications of each of the discourses and then discusses how these can inform extension activity and policy development.

Implications: the Discourse of Money

The Discourse of Money is characterised by statements that focus on maximising profit, maintaining economic growth, supporting technological and financial market fixes and orchestrating opportunities through competitive advantage. There is a view that the challenges of climate change can be managed through current cultural and social structures of capitalism. Climate change and its impacts on agriculture are regarded as being able to be overcome by solutions driven from government and industry. Technological and market-based solutions to climate change are assumed to be possible and while they may be initially expensive, they represent the fairest, quickest and, in the long-term, most cost-effective way of responding.

In this discourse, government is perceived as having the power to make important economic and political decisions, yet not trusted to make them fairly or equitably, especially in terms of industry profitability. There is a focus on the costs of action

in response to climate change but possible costs of inaction are ignored. Mitigating climate change is seen as too expensive and government and society should simply adapt to whatever changes may occur.

In the Discourse of Money, delaying action to prepare for climate change is not motivated by a sense of denial or avoidance of change. There is an assumption that predictions of extreme change are exaggerated and that adaptation is an innate human capacity. Climate change is perceived as a simple extension of climate variability, rather than as a total shift in the climate system. There is also a perception that, because farmers are already skilled at managing climate variability, climate change poses nothing new. This confidence is strengthened by a belief that Tasmania will not have to cope with changes as major as other areas of Australia or the world. Therefore, the most logical action is to wait until the impacts of climate change have become more apparent and then wait for market forces to create the necessary adjustments.

In the Discourse of Money, connections to the right people are important, to get information early and to act ahead of the competition to create power. Those in power have access to information which helps them decide what position to take. For climate change, action is currently resisted because it is not yet proven, not yet certain, and is not being communicated clearly or simply enough. This discourse regards uncertainty and ambiguity as problems that will be overcome by time and by necessity. Those who are situated in this discourse do not see their inaction as a problem because action is currently not logical.

Climate change action in the Discourse of Money is seen as a cost that outweighs any benefit, and as a risky financial investment for a delayed, future advantage. Inaction on climate change is not seen as financially risky because it is assumed that there is still time to act at some time in the future when the risks and opportunities have been more clearly established. The possibility of financially beneficial climate change actions are not yet being considered, as there is still time to make any changes once they have been proven on other people's farms.

Information showing that Australia is likely to be particularly affected by climate change and that Australian farmers are particularly likely to suffer this burden financially (ABARE 2007), is rejected in this discourse.

This discourse does not recognise that adaptation is a finite process and perhaps insufficient to respond to climate change (Howden et al. 2008). Climate change is perceived as on the spectrum of climate variability and therefore within the boundaries of achievable adaptation. Climate change is neither urgent nor extreme in this discourse and is therefore still far enough in the future to allow time for gradual action as needed, appropriate and in step with the rest of the world.

In the discourse of Money, nature as an entity with an intrinsic value separate to the human economic and business system, is ignored. The environment is only considered insofar as it is a necessary support for human endeavour, in terms of business production or recreation. How other species cope with climate change is therefore not considered. This means that action on climate change for the sake of the environment is rejected.

Implications: the Discourse of The Earth

The Discourse of The Earth is about fatalism, nature and the cosmos as divine powers. While there is concern for the negative influences humans have on the environment, there is a belief that these are too insignificant to have any real effect and that the world will persist relatively unchanged. In other words, the Earth has the power to endure. There is a strong sense that humans do not have dominion over the Earth but that the Earth has dominion over humans and that the Earth is vast and beyond human comprehension.

In the Discourse of The Earth, there is a sense that because the climate is controlled by an external force, climate change might be part of a divine purpose and therefore not of any great concern. Consequently, climate change may

promote natural evolution of humans and other species, or humans may even be wiped out, but the Earth will evolve and continue in a different state.

This discourse regards action in response to climate change as important for respecting the Earth but as largely irrelevant to the future of the world. Climate change therefore represents a positive tool for encouraging society to reconnect with nature and to live more respectfully and sustainably, not because it will change the outcome for the world, but because it is appropriate to properly honour the sacred beauty and majesty of the Earth. Climate change presents an opportunity for more environmental values to be reinstated into society. Once this occurs, it is assumed that climate change will be accepted by more and more people as a natural process beyond the capacity of humans to influence.

Climate change in the Discourse of The Earth is not perceived as something that can be managed, nor is it seen as necessary to respond. The Earth is regarded as being in complete control and therefore humans should let natural processes take effect and accept whatever outcomes may arise. Social change will be created through the realisation that a new perspective on nature is essential in order to be moral, healthy, good and sustainable. As people are ineffectual influences on the Earth, governments are distrusted as advocating action for climate change purely for political or popular reasons, which have nothing to do with environmental sustainability or social change. In this discourse, the responses of government to climate change are seen as a waste of time and resources.

This discourse is against action to address climate change, although it might advocate such action for another purpose. This is because climate change is regarded as natural and therefore to be accepted, although changing behaviour to be more sustainable is regarded as more respectful to the Earth. This discourse is against interference with nature and it may distrust science, because science seeks to know the unknowable in Mother Nature and therefore is either wasting time, or if pushed too far, at risk of provoking Mother Nature’s wrath. Science in this discourse is accepted when it is about knowledge through observation but

rejected in terms of science as mastery, control or a capacity to intervene in natural systems. The knowledge that science can provide the answers is regarded as limited and, while it can be useful in specific contexts, it is often irrelevant when it comes to larger issues such as climate change. In the Discourse of The Earth, there is a belief that science has elevated some environmental issues to public concerns unnecessarily, because new forms of technology create awareness of previously unknown environmental processes, such as melting icecaps and ocean acidity. Climate change is seen as the latest and most extreme example of an environmental issue that is only thought of as a problem because of new scientific knowledge and monitoring.

Those in the Discourse of The Earth do not feel strongly connected with society or with humanity. This means that concerns for humanity generally are not significant and issues of equity are ignored. There are no concerns about any inequitable impacts of climate change because people are essentially all the same and because the way different groups will be impacted is ordained at a higher, integrated level, not at a human constructed social level. Therefore equity is both assumed and ignored.

In the Discourse of The Earth, little importance is attached to maintaining social structures to support a healthy human society. Economics and politics are seen as largely superfluous because they are not connected to supporting natural ecosystems: the most fundamental aspect of life. Economics and politics serve a purpose that is solely for humans' own benefit and those in this discourse regard these social structures as less worthy of attention than serving nature and the environment.

Implications: the Discourse of Human Responsibility

The Discourse of Human Responsibility is about people and the responsibility that people have to care for the world, especially to support future generations. This discourse has agency as a key feature. While this discourse has a very

positive element about community engagement and social action driving more equitable and desirable government policies and eventually a better world order, it is restricted by a lack of clear or unified sense of how to act. Perceptions of the limitations of current social structures at both local and government levels can lead to a sense of confusion or hopelessness. Central to this discourse is the desire to do something. There is a sense of insecurity about the effectiveness of available actions, feeling alone in acting, feeling that there is insufficient support or that actions are too difficult. Trying to act and being unsuccessful or citing wholly-unrelated actions as important are indicators of this discourse. Society is regarded as the problem and the tools to change society are identified as collaboration and cooperation among people and the demand for social transformations that need to occur through the power of democracy. Despite this, these processes are not yet achieving the major changes required to allow all the significant transformations that are prioritised for by those in the discourse.

Anthropogenic causes of climate change are accepted by many in the Discourse of Human Responsibility. Yet, this discourse does not necessarily include a belief that humans had to create the problem in order to feel obligated to be part of the solution. This discourse commonly connects with objectives outside of climate change, such as creating a more equitable or safe community, overcoming loneliness, giving something back or reassessing personal values, including the environment but these are always focused on people. As they are so broad, the objectives of those in this discourse are often difficult to achieve.

In the Human Responsibility discourse, climate change is an emblematic issue that requires more public engagement and public rally. It can only be addressed if enough people join the cause, change their lifestyles, demand widespread changes and together commit to transforming the world. Climate change becomes the catalyst for creating more equitable and desirable government policies, healthier lifestyle choices, valuing local communities and the environment more and creating a more stable, social world order. In this grand plan, climate change can get lost amidst demands for changes in other issues. This discourse is against

action that is inequitable or delayed and can be distracted by criticism of other unsuccessful attempts to promote action, such as government-driven emission reduction schemes, rather than actually taking action itself. These issues tend to cloud practical ways forward for those embedded in this discourse.

In the Discourse of Human Responsibility, the environment is seen as fragile and fading and as needing human protection, advocacy and support. Yet the value of the environment in and of itself can be forgotten as the focus is on human uses and human needs for the environment. There is a perception in this discourse that nature needs to be preserved to secure the continuation of the human race and this in turn creates concerns about increasing population size and consumption rates. Therefore, social transformations are required to reduce human consumption of resources and to extend the ability of the planet to support the growing number of people. The lack of processes for managing this equitably is recognised as a problem that does not yet have a solution.

The Discourse of Human Responsibility encapsulates potential action and actual action only occurs on a small scale, often confined to particular communities or groups. Many of these actions are multifaceted and support agendas other than climate change. Nevertheless, many of these other issues still fundamentally promote the need to look after the planet for all those who share it now and for those who will inherit it in the future.

Due to the diversity of other agendas it is possible for issues of the environment to be silenced in this discourse and climate change may be absent as other issues take over. Many issues in the Discourse of Human Responsibility overlap because it aims to address multiple goals, from multiple directions. Currently the desire of those in this discourse to achieve multiple goals simultaneously may need to be revised if action for climate change is to be achieved.

Implications: the Discourse of Questioning

The Discourse of Questioning is characterised by statements that focus on issues of fact, truth, knowledge, information and trust and it isolates itself from the problem by focusing on questions. It emphasises aspects of uncertainty or incomplete knowledge and the complexity of climate change. Vested interests are seen as exaggerating climate change, and while there is probably some element of truth in how humans cause negative environmental impacts, the extent to which this occurs and how these are best addressed is still unknown and unable to be discerned until emotional oversensitivity and media deception have subsided.

The Discourse of Questioning includes issues of doubt and the quest for more knowledge as its key features and controversial or emotional information is likely to be distrusted and rejected. Little about climate change is transparent; everything is arguable and contested. Any information is likely to have been found too complex or too difficult to understand. In this discourse, attempts to find more information, talk about the issue, or a willingness to think reflexively about it are likely to be avoided until such a time as the answer has become sufficiently clear and legitimated by more scientific endeavour.

The Discourse of Questioning includes the belief that climate change will not have any severe negative effects until further into the future. This means that there is time to act later, when Australia can build on the knowledge gained elsewhere. For example, additional information can be gained after carbon trading has been trialled in the United Kingdom or the United States of America, or after China has produced cheap alternative technological innovations. Delay is justified in the Discourse of Questioning for the purpose of perfect knowledge. It is common for this discourse to draw on past experiences associated with other issues, which have led to a loss of trust in science and make neutral thinking about climate change particularly difficult.

In this discourse, a solution for climate change is only possible in the future, when conditions are different, more is known and governments and industries have made sufficient progress to create mechanisms for individuals to act. These top-down structures will take some time to implement and are part of the progression of system improvements and adjustments that might otherwise occur for efficiency and sustainability, even without climate change. At present, individuals cannot act because they do not have enough information and because there are currently not enough social structures in place to allow people to act effectively. Once there are easier ways for people to act more sustainably, via top-down changes in social structures, problems will be more efficiently and effectively addressed.

Despite wanting to wait for more information and changing social structures, in the Discourse of Questioning it is acknowledged that gathering sufficient, proven information about climate change will take time and should begin now. There is a concession that, if climate change turns out to be a threat, then action will need to have started early to generate enough information for a timely response. Nevertheless, in this discourse, the concern that climate change will reach dangerous levels is usually rejected because, if climate change turns out to be a serious threat and action should have been taken earlier, by then it will be too late anyway and impending changes will already be irreversible. Furthermore, it is assumed that this potential scenario will be a problem far into the future.

While it is believed that changes in social structures might need to occur to increase the Earth's sustainability, climate change is seen as being unlikely to be solved or managed by market forces or cultural shifts. Instead, major breakthroughs in science will be needed to avoid negative impacts of climate change. In this discourse, to create knowledge, it is important that actions which may appear futile still occur because they could later turn out to be an important contribution to the generation of knowledge and become the innovation that will save the world. The need for actions now in order to contribute to future

knowledge is accepted but not embraced as a reason to become involved in immediate climate change action.

Individual or collective agency is often absent from the Discourse of Questioning because people in this discourse generally look to others, for truth, for blame, or to supply information and examples of action. This means that there is a lack of responsibility and a tendency to rely on others to make decisions. A single person is not empowered to change the way things are and is isolated from the problem and thus from being part of the potential solutions. Instead, the only possible course of action is simply waiting for the future, when things are hoped to be better and new possibilities for action have been created by governments or major social shifts.

Transforming resistance

The four discourses demonstrate how climate change is understood in multiple ways within the group of farmers, advisers and scientists interviewed. Resistance within each discourse is evident from the above analysis and can be used to inform extension advice and policy.

Describing the potentially catastrophic environmental impacts of climate change is unlikely to be motivation for action in the Discourse of Money. To increase the desire for action and the capacity to act in this discourse, the potential financial benefits and future costs of various actions need to be clearly identified. Information about the response of other key stakeholders, especially at government, industry and consumer levels, is especially important. In this discourse, emphasis on the need for individual responsibility for the environment is unlikely to be successful unless closely connected to issues of financial concern. Therefore, there is a need to explicitly highlight the connections between financial problems and climate change, for example reducing input costs by addressing climate change, rather than use a description of other general

impacts. Even for catastrophic environmental impacts, the financial consequences need to be explicit and credible, not general or implied.

The Discourse of Earth supports action through the promotion of the value, goodness and wonder of nature and the need to care for it in a way that is properly respectful and grateful. A detailed discussion of climate change is not necessary to create feelings of responsibility for action and may be counterproductive. Insistence on the anthropogenic cause may, for example, challenge the belief of those in this discourse in the power of nature and its capacity to ultimately prevail. Instead, the best way forward is to highlight the multiple environmental benefits of climate change action with the emphasis on a cultural shift toward sustainability and for all of society to respect the Earth.

In the Discourse of Human Responsibility there is a great deal of willingness to act and therefore significant potential for action. To highlight the emotional reasons or urgency for action will not be effective because the desire to act is already present and further emphasis can overwhelm. Resistance comes from emotional appeals and a perceived lack of ability to act in practical ways. It is important to highlight positive actions which individuals can do immediately, coordinate networks and stimulate connections to motivate change. If able to access the necessary resources, those in this discourse are likely to take action quickly and decisively and people situated in this discourse are also the most likely to create new forms of action at their local community level.

In the Discourse of Questioning, new information from remote sources is likely to be distrusted. The acceptance of personal responsibility for climate change or climate change actions is likely to be rejected. In contrast, an emphasis on the role for the individual in the collection of, and contribution to, new information is a most useful technique. In effect, the best way of transforming resistance in this discourse is by showing people that by producing their own knowledge, they too can create their own vested interest and they can become empowered.

In most situations, it is unlikely that one single discourse will be in effect, although there might be one discourse which takes prominence over the others. Exposure and engagement across the four discourses are useful techniques to highlight the specific limitations of each individual discourse and the possibility of alternatives. This can be achieved by facilitating different groups to work together. Although the Discourse of Money is focused on personal and financial benefits it can be positively influenced by the Discourse of The Earth to see the financial benefits of particular niche and high end markets that emphasise sustainability, or the environment. It can also be positively influenced by the Discourse of Human Responsibility, which encourages ideas about how to plan for the ongoing financial security of the farm and the farm family, by making more sustainable decisions and looking for long term improvements that are not necessarily motivated by money. The Discourse of Questioning also provides a positive effect on the Discourse of Money by showing how knowledge can be personally produced, so there is scope for action at the individual and industry level instead of waiting for action to be promoted from a government level.

The Discourse of The Earth is assisted by engagement with the other discourses because it helps to reassert the existence of power at a social level, rather than at its cosmic level. This means that there is an increased feeling of agency and purpose in spreading the environmental message to properly care for and respect the Earth. People in the Discourse of Money can demonstrate to those in the Discourse of Earth that there is financial benefit as well as moral and ethical purpose in the promotion of their environmental values. The Discourse of Human Responsibility can help to emphasise the virtue of action, even of only trying to act, for the sake of future generations. The Discourse of Questioning can show the Discourse of The Earth that science, if only on a small scale, can help to support the Earth's natural processes.

The Discourse of Human Responsibility is particularly motivated by connection with people and when aligned with other discourses it is given more direction, purpose and achievable limits. For example, people in the Discourse of Money

can help to focus those in the Discourse of Human Responsibility on the social structures that can be influenced more immediately. Establishing networks and social dialogue is essential for those in this discourse and the enjoyment and positivity it receives from working with others can be a beneficial influence on the other discourses, encouraging them to get involved and share their ideas and concerns. As the Discourse of Human Responsibility is formed through social networks, there is a danger of anti-climate change groups forming in a similar fashion, as has occurred with sceptic forums on the internet. This is problematic because it polarises the issue into a debate and therefore wastes time on attempts to prove that climate change is either happening or not, rather than on doing anything to address it.

People embedded in the Discourse of The Earth and the Discourse of Questioning respond particularly well to the Discourse of Human Responsibility's focus on their special areas of interest as both of these discourses otherwise have a tendency to be removed and isolated. The Discourse of Earth shares with the Discourse of Human Responsibility a moral drive to act and this can be beneficial for motivating those in the Discourse of Money and the Discourse of Questioning to act for the greater good.

In the Discourse of Questioning, rationality and objectivity are particularly valued and therefore those in this discourse can be a useful moderating or calming influence on more emotional extremes present in other discourses. Stress about money, about the end of the world, or the paralysing urgency of the need to act immediately, can cause panic responses from those in the discourses of Money, the Earth and Human Responsibility. The Discourse of Questioning is intensely sceptical of extreme emotional reactions and this response can be reassuring to others. The Discourse of Questioning is also positively influenced by the more proactive elements of the other discourses, as the Discourse of Questioning is the least motivated to action.

Although the Discourse of Questioning does not promote individual action, it has the potential to support action from others because it accepts that some knowledge is already available for how to proceed, and trial and error is an important process to refine and improve current knowledge. This means that the Discourse of Questioning can provide useful support for actions suggested by others. It is often more beneficial to combine discourses than to work with individual groups.

Ways forward for extension and policy

Extension can empower change if informed by the importance of language and the effects of language, in other words, discourse. Understanding the role of discourse in the construction of farmer subjectivity and resulting behaviour is an important step towards this change. Extension has a challenging task in helping farmers adapt to climate change, because the science is complex and the impacts on agriculture and the best actions to take are uncertain. As well as this, the contexts for communication and the range of farmers that extensionists work with are diverse.

The reasons for actions to address climate change become more apparent when they are framed in the discourse in which they are situated. Being exposed to other possible discourses of climate change, through working with other farmers, is also a way to increase opportunities for changing their subjectivities and improving their agency by highlighting other options and providing choice. Therefore, if extensionists are aware of the agricultural discourses that are present in the groups they work with, they can more easily use the language those farmers relate to and choose particular strategies to motivate action. Recognition of farmers' discourses can help reduce conflict, miscommunication and rejection of climate change action.

Climate change is still relatively new in the public and discursive space and therefore discourses of climate change are still open to change. The creation of

new discourses of climate change can be achieved by talking with farmers, facilitating farmers talking with each other, and by recognising where resistance occurs within discourses and how it might be transformed.

The implications of language in the construction of discourses should be explored more fully within extension, so that the relationships between language, thought and action can be brought to bear on understandings of behaviour change. Extension, conceivably a nexus between academia and agriculture, education and farming, and information and practice, is a prime opportunity both for the study of agricultural language and the application of this information as a tool for facilitating change.

Climate policy is an important way of clarifying, motivating and supporting farmer action in response to climate change. Policy makers need to understand the importance of language in different contexts and apply this knowledge as a tool to facilitate change in agricultural communities.

For climate policymakers, recognition of discourse can help to guide language choices and consequently increase farmers' current opportunities for action. Although it is by now well established in social research that people's views are diverse and socially constructed, and that their decisions about action are influenced by multiple, complex factors, in regards to climate change it is important to reiterate these ideas. For climate change, there is no singular, best practice way of communication. Facts about climate change may be uncertain, contested, context dependant, and can be understood in different ways. Therefore, working with individual social contexts is essential for ensuring that information is relevant and that changes can be taken up and actually be beneficial. Information transfer is not the answer, nor is limiting farmers' choices and responsibilities. Rather, creating new socially-relevant applications of information is the way forward for creating more possibilities for action. For farmers, this means that negotiation, co-construction, support, flexibility, diversity, learning, reflection and participation are needed.

In understanding inaction on climate change it is vital to recognise that it is based on legitimate reasons, created by different, equally valid perspectives of climate change. Therefore, inaction is not necessarily created by a lack of information, or a problem of individual psychology, skill or capacity, but rather a socially-created view, which can be redesigned, through new forms of social interaction and dialogue.

Broader relevance

In poststructural research, 'the author is not the final arbiter of meanings, nor can she/he necessarily control meanings' (Davies 2004, p. 6). In this way, the reader of this thesis is empowered to create alternative interpretations and to decide the broader usefulness of the research. While there is no intention to generalise from this research, the results produced may still be more broadly applicable to contexts in the wider community beyond these two groups of Tasmanian farmers and their advisors. Farmers have many of the same concerns as other social groups, and as a social group they are not completely isolated from other aspects of society. Farmers' discourses overlap with discourses constructed in the media from documentaries, news reports, newspapers and advertising, as well as public concerns such as weather events, restrictions, policies, and general knowledge from movies, myths, histories and experiences. Other studies of climate change discourses may reveal different aspects, but similarities are also likely to occur. Issues such as uncertainty, scepticism, wanting to act but being unsure how, concern about the fairness of actions, especially government imposed taxes, confusion about the impacts and the local relevance are all likely to cross spatial and social boundaries.

Border crossings

A greater examination of language has the potential to offer useful insights into all areas of climate change research. Analysis of discourse in more diverse disciplines, such as social research in agriculture, means that crossing boundaries

between traditionally distinct research disciplines is an important way forward for climate change research in understanding how people are able to act. There are many other issues that affect understandings and actions on climate change which were not within the scope of this research, including politics, psychology, health, consumer behaviour, fashion, education and a vast array of other issues. Research into the effects and implications of climate change is being undertaken in all of these areas, but it is insufficiently cross-disciplinary, because of the difficulty of such an approach and because of the conflict in discourses it provokes. Nevertheless, causes of conflict can also be opportunities for transformation and there is substantial opportunity in border crossings for producing new knowledge about the social dimensions of climate change. Discourse analysis is one particular method that can cross the boundaries of traditional disciplines.

Conclusion

As the participants in this study have demonstrated, climate change as an issue needs to be understood as socially constructed through different discourses. Climate change is different within each discourse, making available more possibilities about how to think about climate change and about how to respond. It is highly likely that a combination of the solutions within different discourses will be necessary if the world is to successfully address climate change.

The analysis of resistance at the discursive level in this research is about making visible the normalised processes of society that work to limit people's possible actions and thoughts. In terms of climate change, there are many competing discourses and many processes of resistance. Resistances make apparent how different discourses frame facts and limit available responses. The dominant discourse and the sites of resistance about climate change are different for different social groups, therefore reconceptualising resistance as socially constructed and context contingent means that change can be better facilitated.

Each of the four discourses constructed from this research shows a distinctly

different way of framing the issue of climate change. These are: as an issue of business viability; as an environmental concern; as a call for social action; or as a problem of trust and information. Knowledge of which of these discourses is at work within different social settings allows for different approaches for facilitating behaviour change to be implemented. Each of the discourses provides opportunity for action by focusing on the particular aspects that are central to the discourse and that would therefore motivate change through highlighting issues of financial benefit, environmentalism, social action or trusted knowledge.

Climate change means that sustainability and the environment are more important to extension and policy than ever before, but they are understood in a diverse range of ways. Australian agriculture is likely to be put under significant pressure to implement a wide range of changes in practice for reasons of adaptation, mitigation and social responsibility. A social consideration of the agricultural community's behaviours and perspectives is now even more important. The diversity of social understandings and responses to climate change means that a new method for facilitating change is required. In order to cope with diversity, this new method needs to be focused on a social level of change in order to have a meaningful and significant effect.

CHAPTER 7

Conclusion

This research was conducted to benefit farmers and those working with farmers, to increase the range of possible actions in response to climate change. Current research suggests that agriculture and agricultural practices must change to adapt to climate change (Stokes & Howden 2010) and to contribute to reducing greenhouse gas emissions (Gunasekera et al. 2007). Resistance to change, evident at all levels of society (Ereaut & Segnit 2006, 2007; Garnaut 2008; Lorenzoni et al. 2007; Milne et al. 2008), limits the possible responses to the challenges created by climate change but resistance can be a positive opportunity for change.

Applying discourse analysis to extension highlighted how awareness of discourse is a most appropriate tool for achieving more effective extension. Communication with farmers, particularly about climate change, can be improved if there is a better understanding of local and social contexts and their specific discourses and resistances. As well as this, it is important that farmers are actively involved in the process of producing their own knowledge and actions, allowing them to participate in creating new discourses of climate change. The particular ways that resistance is created because of social discourses emphasises how discourses can limit farmers' available subject positions and agency and hence, their abilities to act. Greater awareness of discourses is only a first step towards improved communication and agency and there is a need for the generation of new discourses that can connect with more social groups in these farming communities.

Critical reading of the climate change literature and a focused analysis of transcripts of interviews demonstrates that there are several previously unrecognised discourses of climate change currently limiting farmers'

possibilities for action. Chapter Two identified three persuasive and culturally endorsed discourses which position farmers no differently from any other social group. The literature endorses and supports a discourse of logical action, a discourse of complexity and a discourse of culture. These three discourses ignore the special concerns of different social contexts, including agriculture.

Discourses constructed from the analysis of interview transcripts with Tasmanian agricultural communities demonstrated four distinct ways in which climate change is constructed. The four discourses are: the Discourse of Money, the Discourse of The Earth, the Discourse of Human Responsibility, and the Discourse of Questioning. They demonstrate how farmers relate to climate change in different ways, which have quite different effects on how action is thought to be possible. Instead of advocating any one particular understanding of climate change, a poststructural view which encourages multiple understandings can create more possibilities for action and change.

How farmers fit their understandings into already established cultural perspectives highlights how climate change is, can be, and perhaps should be, differently understood in order to create a diversity of responses and open up possibilities. Each different discourse also generates different forms of resistance to action. These should be examined and transformed into opportunities for change.

Climate change is understood in diverse ways that need to be acknowledged when behaviour change is being promoted by extension, policy, or any other organisation. Once the particular understandings of climate change operating in specific social groups have been identified, practical insights into ways forward for facilitating behaviour change can be achieved. These include different uses of language, framings of ideas, different emphases and even omissions of particular information. Knowledge of discourse can benefit extension because discourses demonstrate the distinct differences in how issues are understood and how possible actions are regarded. In relation to climate change specifically, extension

can benefit even more, because the discourses of climate change are still relatively new, still being produced, and therefore, they are still able to be influenced and changed.

It is not useful to regard climate change as a single fact that people must adapt to but rather as a phenomenon that people can recreate discursively in different ways, with multiple opportunities for action. Climate change needs to be acted on at the local level in a diverse range of ways, so a number of social constructions of climate change are a positive way of increasing the range of possible actions that are able to be considered. More awareness of the theory and effects of discourse and a greater range of discourses of climate change are still needed to create these multiple ways forward. Other ways of responding to climate change should be encouraged and explored so that more diversity can be created and new possibilities for actions made available. In contexts where discourses similar to those described in this thesis are present, connecting with these particular constructions of climate change may encourage farmers to relate to climate change and respond in positive ways.

Those involved in extension and agricultural policy development should be particularly aware of the importance of language and the diversity of discourses that are present in particular social groups. Wherever possible, they should aim to include farmers in processes to engage relevant discourses and reduce the likelihood that information is misunderstood or rejected. Information alone is not sufficient in framing advice or justifying policy, in many cases more can be achieved without the need for new information by communicating with groups in language that reflects their discourses. Therefore, some general recommendations for extension and policy workers are:

- Be aware of the importance of language and the effects of language, in other words, discourse
- Be aware of the particular context of your audience

- Reinforce the value of different ideas and work with farmers to encourage the creation of new understandings of climate change and new possibilities for action from new discourses.
- Prescriptive recommendations or perfect messages are not possible because there are complex and diverse understandings of climate change.
- When communicating about climate change, an understanding of the varying social contexts and engagement with farmers' personal situations is essential. In other words, it is important to know your audience and be aware of diverse farming styles, learning styles and discourses.
- As climate change means different things to different people, it is useful to develop shared definitions of climate change within each group as a way to develop engagement and facilitate action.
- Information transfer is not useful. Information may be important, but if it is inflexibly supplied to farmers from experts, it is likely to be rejected.
- Multiple possibilities for action need to be encouraged. Climate change practices need to be integrated into the whole of farm operations and can have multiple benefits not necessarily solely for climate change.
- Opportunities for farmers to work with each other to participate in sharing knowledge and experiences about climate and possible climate actions are important. This combines discourses and encourages social learning, engagement and ownership.
- Recognition of farmers who have implemented successful changes is valuable.
- Communication to farmers means working with diverse family farm businesses, so there are multiple personal considerations involved.

Agricultural research, even rural social research, has yet to fully engage with the potential insights offered by discourse theory. Publications from this research (Fleming & Vanclay 2009a, 2009b, 2010) contribute to the literature on extension (Fulton et al. 2003; Pannell et al. 2006; SELN 2006, 2008; Vanclay 1992, 2004; Vanclay & Lawrence 1995a), by demonstrating the potential for it to benefit from theories of discourse and by detailing the methods through which this can be

achieved. The research also contributes to the wider literature on climate change communication (Hulme 2009; Moser & Dilling 2007; Pettenger 2007), by demonstrating the distinct and important effects of discourse and the potential insights to be gained from careful analysis of discourses. The thesis (see also Fleming & Vanclay 2009b, 2010), has moved from a theoretical view of language to an analysis of discourse in a specific context. It is a practical application giving substance to language concepts noted in recent reviews on climate change communication (see Moser 2010 and Nerlich et al. 2010). It is encouraging that the potential for language to transform the climate change message is being recognised in research and communication.

In summary, climate change is currently understood in a diverse range of ways, but no single way is sufficient. Each discourse has something to offer in terms of creating agency and change. Nevertheless, new ways of understanding need to be actively socially constructed in order to increase the possibilities for climate change thought and action to be improved. New discourses will lead to a better range of actions available to farmers. Ideally, this research is just the beginning of the process of recognising discourse and actively creating new, more empowering discourses of agriculture and climate change.

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Appendix: papers published

Appendix: papers published

Chapter 9

Discourses of Climate Change: Understanding Farmer Resistance

Aysha Fleming and Frank Vanclay

Introduction

Climate change requires changes in behaviour by everyone, both to reduce further impacts and to adapt to the changes that are already inevitable. Despite calls for people to respond to climate change from many areas of society – e.g. media, government, business, environmental groups and scientists – there is still uncertainty about how to act. Further, while many of the dangers of climate change seem controversial and far away, the solutions seem difficult or ineffectual. Acting to minimise or avert future harm is easily perceived as less important than acting in response to current issues, especially because how climate change impacts will become personally relevant remains unclear. Behavioural change is difficult because it requires investments of energy, time, thought and emotion, and even then it might not work! People are socio-cultural, emotional beings, therefore what is nice, easy, familiar, and what others are doing, is usually much more appealing than what might be 'rational' from some scientist's perspective. Furthermore, controversy rages as vested interests on all sides produce conflicting climate 'facts' and calls to action, so there are often good reasons to be sceptical of new practices being promoted by governments and other organisations. For all these reasons, resistance to implementing responses to climate change is widespread, including within the farming community.

Early action to adapt to and mitigate climate change is critical for farmers, to allow time for a smooth transition and create potential benefit, yet there are many reasons why it would seem logical for farmers to resist taking action. Multiple uncertainties relating to all the components create confusing messages. These include: uncertainties in the science; the effects on agriculture; how the varying notions of community will respond; variances in farmers' individual beliefs about

climate change and capacities to act; problems of intangibility, magnitude and scales of space and time; and different constructions of the problem. This chapter argues that farmers' beliefs about climate change are linked to different constructions of climate change which occur within particular discourses – power relationships in society that shape how people think, speak and act. For example, climate change is constructed differently by science (Sarewitz, 2004); the media (Boykoff, 2008; Carvalho, 2007); politics (Oels, 2005; Backstrand and Lövbrand, 2007); and environmental education (Moser and Dilling, 2007; Clover and Hill, 2003). Each of these different constructions is problematic because each simply advocates one discourse and one set of solutions over another. Instead, this chapter argues that a new way of thinking that allows multiple perspectives within multiple discourses needs to be enabled to address the wide ranging aspects of the problems created by climate change.

The current dominant discourses of climate change are scientific problem framings, a focus on individual action and government led regulation of neo-liberal market-based solutions. These solutions are unlikely to be sufficient, effective or equitable, particularly for farmers. The reasons farmers resist taking up these actions, therefore presents an opportunity to uncover alternatives to the dominant discourses.

The chapter advocates the need for taking a discourse approach in order to increase understanding of likely farmer and community response to climate change. It is largely descriptive and analytical, but draws on insights gained from interviews conducted with 40 dairy farmers and apple growers in Tasmania and with 10 other people who work in the dairy and pome industries.

Understanding resistance and discourse

Resistance means different things within different theoretical frameworks and also 'because what is resisted and who resists constantly changes' (Darier, 1999, p. 223). Within sociological and psychological frameworks, resistance most often refers to an individual's reluctance or refusal to do something. Within politics, resistance can mean rebellion or revolution. Within medicine and agriculture, resistance refers to strength or resilience. The framing of the word 'resistance' in this chapter comes from Michel Foucault who pioneered discourse analysis

and studies of power relations in the 1960s (Rabinow, 1991). Resistance, according to Foucault, is inextricably linked to power relations. This chapter is based on Foucault's theories on discourse and resistance. It acknowledges and embraces the various interpretations of Foucault and adds yet another 'version', one that emphasises the subjective nature of the creation of an individual perspective and that this is inevitably shaped by our own experiences and ideas. Resistance is a means and a process, it is dynamic and changeable. It occurs wherever there are power relations, and power relations (and discourses) occur wherever there is society:

> there are no relations of power without resistances; the latter are all the more effective because they are formed right at the point where relations of power are exercised; resistance to power does not have to come from elsewhere to be real…it exists all the more by being in the same place as power; hence like power, resistance is multiple. (Foucault, 1980, p. 142)

Power and resistance are not opposing 'forces' but are intertwined with all other kinds of relations that exist in society: 'Power relations are rooted in the whole network of the social' (Rabinow and Rose, 2003, p. 141). They are not simply good or bad, they are both and neither, in different ways at different times and in different situations, so only detailed, localized studies of events can reveal the particular resistances occurring at any time and place (Darier, 1999).

The multiplicity of resistances is not well understood and offers a potential way to increase understanding of farmers' alternatives for taking action for climate change. A study of the resistances that exist in different social groups can be found through discourse analysis and is fundamentally linked to power. It is a matter of understanding how power and resistance are created by the forms of cultural, social and economic hegemony within which they operate (Foucault, 1980).

Discourses are invisible, dynamic structures which are socially, historically and culturally constructed and which shape how we speak and act in different situations. Exposure to particular discourses over time creates perceptions about what is good or bad, normal or abnormal, and thus the discourses we operate our lives within significantly shape how we think. By establishing limits of thought, discourses construct who is powerful, who is not, what is possible and

what is impossible. Therefore, discourses enact considerable power. Yet discourses and the power relations they promote are not incontestable or unchangeable. Although we are never outside of discourse, neither are we necessarily 'trapped and condemned' (Foucault, 1980, p. 142). Greater awareness of discourses enables greater agency.

A dominant discourse in society constructs climate change as a scientific discovery (Sarewitz, 2004; Demeritt, 2001). Climate change was found through objective scientific observations and quantitative measurements of data, which have been occurring since the time of the ancient Greeks (Demeritt, 1998). Many scientists from many different disciplines contribute to many different understandings of climate, including those from sub-branches of climatology, oceanography, ecology, geology, geophysics, hydrology, vulcanology, glaciology and dendrochronology. Anthropogenic causes of climate change (i.e. human-induced) are difficult to separate from natural causes, but nevertheless are observable and measurable and therefore reducible and controllable. Within this discourse, climate change is seen as being based on objective evidence that, while containing gaps and uncertainties, can be verified by others and therefore trusted as 'true'. This in turn affects how climate change is thought about and what is seen as possible. It is desirable to discover more knowledge, and to search for innovative solutions to improve efficiency and technology (with science being an active agent). Climate change is seen as complex and uncertain, with more expert knowledge needed, because, by better understanding the source of the problem, we can better understand the necessary solutions. In this discourse, science holds the key to this knowledge and therefore to the 'answers' of what to do. The public simply need only to be informed to act, and sceptics need to be urgently convinced of the rightfulness of this scientific way of thinking and/or discredited and/or silenced. Climate change is separated into different elements, for example, carbon dioxide, temperature, sea levels etc. Actions therefore become linked to these separate elements, such as reducing carbon emissions, adapting to temperature changes, sea level rises, and so on.

For farmers, resisting the scientific construction of climate change is logical because it is not embedded in, or inclusive of, their local knowledge. The uncertainty and corresponding margin for error of

science fuels their resistance, particularly in implementing untried practice changes that could have many undesirable consequences. Climate change, however, can be constructed differently in other discourses. It can also be constructed socially, politically, mythically, religiously, medically, individually and within many other discourses. This reframing of climate change away from the scientific discourse changes how the problem of climate change is seen, and what actions are available. For example, socially, climate change is a problem of lifestyle which involves issues of values and equity. In that discourse, the solution involves improving global human rights and civic responsibilities, with broad holistic changes in culture, education, resource management and politics required. In this construction of climate change, farmers are given particular responsibilities for producing food and essential products, especially for the local community. Individually, climate change is about an individual's carbon footprint and personal responsibility, values, capacity to act, etc. The solutions then centre on the individual's choices to be energy efficient, to reduce waste, use public transport, and so on. In this case, farmers have a particularly large burden to personally negate emissions from their farm – animals, fertilisers, fuel etc. with trees and carbon credits.

Climate change is different within each discourse. Therefore, more possibilities become available about how to think about climate change and about how to respond if there is a greater awareness of the variety of discourses that exist. It is highly likely that a combination of the solutions in the different discourses will be necessary if the world is to successfully mitigate the worst effects of climate change and adapt to the inevitable impacts. No one dominant discourse will be able to 'solve' climate change, but the available range of actions can be increased if different 'resisting' discourses contribute to what is possible.

A single discourse is inadequate as a solution to climate change, because many problems associated with climate change are linked to cultural, social and political aspects of the current hegemonic discourses of society, including perpetual growth, consumerism and other assumptions about quality of life, individualisation, the commodification of nature and its separation from people, declining environmental values, community disengagement, disempowerment and apathy (Potter and Oster, 2008; Diamond, 2006; Prinzen et al., 2002; Clover

and Hill, 2003; Kollmuss and Agyeman, 2002). Climate change presents an opportunity to address many of the problems that exist in the world today because 'it may be difficult, perhaps pointless to separate possible effects of climate change from current serious problems' (Rahman and Huq, 1998, p. 194). As Albert Einstein famously stated: no problem can be solved from the same level of consciousness that created it, therefore a new discourse, and preferably multiple discourses are required.

An analysis of resistance is about making visible the normalised processes of society that work to limit people's possible actions and thoughts. The aim is not to replace the dominant discourse with a new one, but to allow multiple 'dominant' discourses, create more options and new possibilities. In terms of climate change, there are many sites of competing discourses and many processes of resistance. Resistances make visible how different discourses frame facts and limit available responses. The dominant discourse and the sites of resistance about climate change are different for different social groups, therefore reconceptualising resistance as socially constructed and context contingent means that change can be better facilitated.

Resistance and agriculture

Public scepticism, apathy and disengagement in relation to calls for environmental change are still prevalent (Clover, 2003; Darier, 1999) despite increasingly serious and global environmental threats like climate change. While climate change has recently engaged academic attention in terms of public perceptions and barriers to action (see Lorenzoni et al., 2007; Moser and Dilling, 2007; Stoll-Kleeman, 2001), there are few accounts of the responses of farming communities, despite widespread acknowledgement of the significant contributions of, and impacts on, agriculture, especially within Australia (CSIRO, 2008; Garnaut, 2008; Gunasekera, 2007; ABARE, 2007). This omission means that the wealth of literature on adoption of innovations (see Pannell et al., 2006 for a review) and the many reasons underlying non-adoption (e.g. Vanclay, 2004) have so far not been utilised in climate discourses. An examination of why farmers might resist climate change allows these valuable fields of literature to be connected so that a more

social understanding of behaviour change, and alternatives to the dominant discourses of climate change, might become apparent.

Milne et al.'s (2008) recent study of motivation and adaptive capacity in Australian primary industries to respond to climate change is a notable exception to the lack of literature on farmers' perceptions of climate change. They found that a lack of clear information, uncertainty about drought and climate change, a wide range of views on the causes of climate change and the hope that things will go back to 'normal' inhibited farmers' motivation and capacity to act. More than 50 per cent of those involved in their study indicated that they were not taking any action in response to climate change.

Climate change poses a new challenge to the adaptive capacity of farmers because the extent and pace of future change will be more than they have previously experienced. Efficiency increases and technological innovation are likely to be incremental and finite. Instances when farmers cannot, or choose not to, respond to future climate change can provide a rich data source for analysis of the limitations of society's current hegemonic discourses. In order for climate change communication to be more accepted and acted on, new approaches to farmer learning and to understanding their responses are needed.

Farmers are likely to need, and be the target of, scientific climate change information because agriculture is particularly affected by climate and the weather. Concomitantly, agriculture is also a significant producer of greenhouse emissions, accounting for 13 per cent of all emissions worldwide (Walker and King, 2008). In Australia in 2005, 17 per cent of greenhouse gas emissions came from agriculture (Garnaut, 2008). The severity of agriculture's contribution is significantly increased by assessing particular gasses, for example 84 per cent of nitrous oxide emissions and 60 per cent of methane emissions (ibid.). This means that agriculture is likely to face considerable pressure to mitigate emissions, as well as to adapt to the changes in climate already set in place. Methane and nitrous oxide are particularly important gasses because they are much more effective at trapping heat than carbon dioxide (60 times and 270 times more than CO_2 respectively). While they make up much smaller proportions of the atmosphere than CO_2, they have a much greater effect on climate change and therefore are highly significant factors to consider (Flannery, 2005).

Agriculture is a core industry for Australia and is highly significant to the economy, employment, land use, and even to the Australian identity. Major changes in agriculture will have flow-on consequences to all aspects of Australian life. It is projected that Australia will be 'one of the most adversely affected regions from future changes in climate in terms of reductions in agricultural production and exports' (ABARE, 2007, p. 657). Australia also needs to continue productivity growth as food production and distribution is likely to become a more critical global issue. With increasing world population, and existing food shortages likely to exacerbate, the pressures on agricultural systems everywhere are increasing, even without the impacts of climate change. Australia's geography and demography, with its concentrations of people living on the coast, as well as its current climate of 'drought and flooding rains', means the effects of climate change in Australia and for agriculture in particular are potentially severe. This is an issue that must be addressed. How agriculture can and will respond is essential knowledge for farmers, policy makers, governments and citizens alike.

Farmers are familiar with, and much affected by, changes in society and the environment. Market forces surrounding energy, transport, commodities, exports and carbon trading schemes are important factors that influence farmers' financial and social welfare. There are information sources aimed at facilitating farmers' decisions in regards to each of these areas. In relation to climate change, there are even more sources of facts and advice for farmers. These different sources all foreground particular information in different, even contradictory ways, and advocate different courses of action. Climate change information is often complex, uncertain, global, and future oriented, therefore, it requires careful evaluation to be relevant to the individual circumstances of each farmer. Farmers have long needed to be critical of information that comes from 'expert' sources, which is often not relevant to local contexts or needs, and tends not to value the individual knowledge and experience of farmers (Wynne, 1992a; Vanclay and Lawrence, 1995; Vanclay, 2004). Understanding the vested interests in climate change information, as well as how to gain personal benefit, is becoming an increasingly important and time consuming task for farmers.

Farmers should critically evaluate the information they receive to examine for whom the information was written, how it frames the

reader, and what it constitutes as factual, beneficial, essential and urgent. They also need to be critically reflective of climate change information if they are to take early actions potentially of benefit. Traditional theories of learning – i.e. by doing (practical learning), with and from others (social learning), and collaboration with/across institutions (institutional learning) – are no longer sufficient. Farmers must apply critical thinking to all their new knowledge formation to apply it to their own circumstances and relate it to their specialist local knowledge base (Armitage, 2008).

Resistance and approaches to farmer learning

Critical literacy is an education theory that makes apparent whatever competing interests are at work within texts and operates in tandem with an analysis of discourse. This is certainly applicable to climate change information. Climate change will not affect the world equally. It is a global problem, yet the contributors to anthropogenic causes of climate change, and those likely to be most affected, are entirely different groups (Agyeman et al., 2007). Political, social and cultural influences are all at play in climate change causes and effects.

The long time scales from cause to effect and the intangible nature of climate change means there is little opportunity for farmers to learn directly from observations. Not everyone perceives the physical evidence of climate change, or they may relate it to different causes, because knowledge constructions are grounded in different places and contexts, so awareness and acceptance of climate change will vary from individual to individual. Resistance to an action that targets a distant, invisible or natural occurrence is much more likely than resistance to an action relating to an immediate threat (Moser and Dilling, 2004).

Climate change provides a particularly significant challenge to farmers and therefore critical literacy and the identification of the power relations present in climate change 'facts' are necessary. Awareness of different power relations creates agency to choose between, act within, or work to transform the interests that constrain the needs of farmers.

Why does climate science communication create resistance?

Science has a long tradition of being positioned in society as a source of authority and expert knowledge. However, post-war and post-modern times have seen science encountering public apathy, scepticism and distrust. At various times, including now, a strong interest has arisen in the field of the public understanding of science. Recently there has been a focus on scientific communication and the public understanding of climate change (Lubchenco, 1998; Ungar, 2000; Stoll-Kleeman, 2001; Kollmuss and Agyeman, 2002; Sarewitz, 2004; Moser and Dilling, 2007; Milne et al., 2008). Questions of why climate change is not creating the urgent responses and behaviour changes that many scientists deem necessary reveal that the underlying cultural assumptions of scientific approaches to understanding the public uptake of science are still as relevant today as they were for Wynne in 1992:

> This pervasive sense of lack of public identification with science is equated by scientists with the public lack of understanding of science. Formulated as it is in this way, the problem throws all the critical research attention on the public and the media. The only problems within science are to do with inducing scientists to communicate more clearly and entertainingly in lay terms. Questions such as those about whose interests are served by different kinds of science and science representation, and about the basis of trust and social accountability of different institutional forms of control and ownership of science, are effectively deleted. Yet it is these unacknowledged dimensions which shape the public uptake or 'understanding' of science. (Wynne, 1992b, p. 38)

Trust, social fabric and culture are words that need to be re-examined in the light of climate change and for this we need to look at the dominant approaches to understanding farmer learning and adoption of scientific communication. There are varying representations of the major stages in farmer learning and uptake of scientific knowledge across different disciplines. For example, Rogers (1983) lists them as: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation. In extension circles, they are often presented as being: awareness raising; information seeking; decision making; and action taking (see for other variations: Vanclay, 1992; Stoll-Kleeman, 2001; Pannell et al., 2006; Moser and Dilling, 2007; Lynch et al., 2008).

Within the traditional top-down approach to information and technology transfer, there is an underlying assumption of individualism. Individuals are presumed to be responsible for their own knowledge, decisions and actions, and therefore the emphasis is on supplying information, persuading, and providing support to individuals in order to promote the desired change. This approach sees a direct, rational link between knowledge of the problem, seeking information about how to address the problem, and the uptake of behaviour in response to the problem. Specifically tailored messages, adjusted to the types of individuals who are the intended recipients of the information, are seen as being essential to overcoming the barriers to changing behaviour. However, changing behaviour is hard and people do not act purely for rational reasons, or solely in response to the provision of information. Changing behaviour requires a number of different steps, which require thought, time and energy, as well as connection with wider social institutions and networks. People rarely make major decisions without careful consideration of others and without discussion with others.

Within a socially critical framework, behaviours are embedded within different contexts and linked to institutions, social networks and the physicality's of place. These must all be considered and adapted or transformed with the adoption of even seemingly simple behaviour changes. For example, a farmer's decision to use one product over another involves the sourcing, purchase and integration of the product, as well as potential problems of familiarity with the old product, supplier, traditional practices and norms (McKenzie-Mohr and Smith, 1999). Therefore, the alleged causal link between information and behaviour is complicated by many external factors. These external factors can limit people's behaviour and possible responses to information and change, thus 'behaviour change is not a one-by-one persuasion task but a social challenge' (Tribbia, 2007, p. 248).

Communicating climate change, more than overcoming resistance to science

Understanding the discourses that exist around climate change in specific contexts is essential to understanding the power relations, reasons for resistances, and the possibilities of change that exist. The simple provision of information is not sufficient because that does not

address underlying social constructions of the problem, or the limitations inherent in the behaviour changes being advocated. Rather than an individual focus, it is imperative to develop an understanding of the social discourses that frame or construct an issue and an awareness of the scripts that support the discourses. Scripts represent social constructions of the reasons for resistance, as well as cultural expressions relating to the likely problems encountered and many other issues (Vanclay et al., 2007). They influence how people respond. Some of the scripts that mitigate people's responses to climate change are listed in Table 1. The contents of Table 1 are a composite of topics that have been distilled from the literature on community response to climate change, that emerged from interviews specifically undertaken on this topic, or that are part of our background understanding. They have been organised in a manner similar to Lorenzoni et al., 2007).

Table 1: Scripts that justify Resistance

INDIVIDUAL LEVEL

Lack of Knowledge

1. Causes: Climate change is natural, it is always occurring.
2. Solutions: I don't know what can be done.
3. Consequences: It would be nice if it was a bit warmer.
4. Conflation of issues: It is too cold for climate change to be real; we already recycle.
5. Personal experience: I can't see anything different.
6. Capacity to change: I don't know how to act or if I can.
7. Non-issue: We never talk about it; I'm not interested.
8. Reliance on others: X says climate change is a hoax.

Uncertainty and Scepticism

9. Uncertainty: There is still much disagreement and before we take action we should wait to learn more.
10. Magnitude: The problem is too big.
11. Avoidance: It is all too hard. I don't want to think about it.
12. Complexity: With so many factors involved, how can we be sure of the problem, let alone the solution?
13. Insignificance (local to global): Others aren't acting so our efforts won't make any difference.
14. Denial: Climate change isn't the real problem; it is politics/industry/other people etc.

Distrust in Information sources

15. Doubt: Conflicting information proves it's all a lie.
16. Vested interests: Scientists/media/ politicians/marketers overemphasise the problem to get more money.

Other things are more important

17. Environmental issues: How can we think about climate change when we can't even fix X?
18. Financial issues: I can't worry about climate change when I'm worried about survival.
19. Other personal issues: My kids/house/relationships etc. are all I have time to think about.

Climate change is a distant threat

20. Time: It's an issue for future generations; there is time to learn more before we act.
21. Space: We won't be affected here, the problems will happen elsewhere.

Externalising responsibility and blame

22. Faith: God or Mother Nature (Gaia) has ultimate control.
23. Cosmic: The universe is mysterious, we don't know what has control.
24. Cornucopia: Science and technology will always conquer all problems.
25. Responsibility and obligation: The big polluters are responsible, not me.
26. Leadership: There's no point acting until targets have been set.
27. Balance: Market forces/population crashes will occur to balance things out.

Reluctance to change lifestyles

28. Frugality: It's depressing reducing emissions.
29. Resources to change: I can't afford solar panels; It is impossible for me to do without X.
30. Habit: I like the way things are and the things that I do.
31. Rejection/polarisation: I'm not going to become a vegetarian to cut down on greenhouse gas emissions.

Fatalism

32. Armageddon: Climate change will be catastrophic so we might as well have a good life now.

Helplessness

33. Fear, anxiety, hopelessness: I hear so much bad news, I just can't cope.
34. Large issues overwhelm: disease outbreaks, overpopulation, food shortages, extreme events, everything is bad.

SOCIAL/COMMUNITY LEVEL

Lack of political action

35. Distrust: Governments (local, national and international) aren't doing anything.
36. Ineffective action: Their plans aren't going to work.

Lack of action by business and industry

37. Corruption: The big companies have too much power; they don't care or want to change.

Worry about the free-rider effect

38. Disadvantage: If we take measures because of climate change and others don't, it won't be fair, we won't be able to compete.

Social norms and expectations

39. Consumer culture: If I don't have the latest things I won't be successful.
40. Identity and self perception: I'm not a tree-hugger/greenie.
41. Fad: Save the polar bears.

Lack of enabling initiatives

42. Infrastructure: There are no viable alternatives for me to change power providers, transport etc.

Justice considerations

43. Equity (in all forms): Who benefits, who suffers?
44. War: In the fight against climate change casualties are unavoidable.
45. Altruism: We have a duty to look after all humanity, is one group more important? E.g. first world.
46. Stewardship: We have a duty to look after nature, is one environment more important? E.g. forests.
47. Species: We have a duty to look after all species, is one species more important? E.g. humans.

Each of the scripts in Table 1 can lead to resistance to changing behaviour and they need to be understood in terms of individual contexts (time, space, culture, class, gender, etc.). They cannot be addressed with specifically-targeted tools or techniques, but require systems level thinking and holistic approaches. Therefore, this list of scripts and their overarching discourses represents multiple sites of opportunity to explore the different social constructions of climate change that exist, which may allow new actions to manage climate change to become apparent.

Discursive Discussions

Foucault's form of discourse analysis looked at power and resistance. Followers of Foucault look at issues where power relations commonly occur, such as gender, culture, ethnicity, class, etc. Other forms of discourse analysis look at the dominant social constructions of concepts of climate change without links to power relations (Ereaut and Segnit, 2007). As yet, farmers' discourses have not been explored. Some social constructions of climate change are normalised and therefore not recognised, yet they can have particular consequences and limitations on behaviour. Several commonly-ignored social constructions that limit behaviour around climate change are introduced below and in this chapter are applied to farmers.

Individual agency

Climate change information often targets the individual's sense of responsibility and environmental concern and concludes with suggestions for action to promote a sense of individual agency. The movie, *An Inconvenient Truth*, is a good example of this. However, individualising actions to manage climate change are problematic. The actions individuals can take to help reduce greenhouse gas emissions can seem trivial, e.g. planting a tree, recycling, or changing a light bulb (Prinzen et al., 2002). For some farmers, the changes suggested may seem inequitable, impractical or impossible. The argument to 'do your bit' for the community (local and global) and conform to social expectations, relies on a belief that others will also act, including governments and industry (Bulkeley, 2000). At the same time, the actions that are seen to be most significant are inhibited by existing

social structures and infrastructure (Potter and Oster, 2008). Individualising responsibility is also ethically contentious as it assumes that everyone is equally responsible and equally culpable.

Issues of fairness and responsibility affect farmers directly because, despite perceptions of homogeneity in capacity to act, there are significant differences between farmers in how they can mitigate and adapt to climate change, even when in the same commodity and region. These differences are based on differing farm size, enterprise objectives, management strategies, social and economic contexts, decision-making processes, personal objectives, information-seeking behaviours, preparedness to accept risk, learning styles and so on (Vanclay, 2004). Individualising calls for action, either personally or at the industry level, are likely to be ineffective and create resistance due to issues of efficacy and equity. Culture, socio-economic and gender factors will affect how people feel they should act and how much they are able to act.

Gender constructions

Gender creates different social responses to climate change which are only just beginning to be fully recognised. While in principle women respond to, are affected by, and have the same capacity to act in response to climate change as men, in practical terms, social constructions of gender, gender roles, societal norms and expectations are still markedly different for men and women. Gender differences have been explored in relation to environmental concerns and adoption of pro-environmental behaviour, but climate change adds some new dimensions to these understandings. Women are reported to be more connected to the environment, more concerned about the future of the environment for children, more likely to feel personally responsible and worried about environmental problems, and more likely to have the role of educating children in environmental responsibility (MacGregor, 2006; Agyeman et al., 2007). Women are also more likely to have reduced capacity to act because of financial limitations, practical limitations and technical limitations. Health and safety issues that occur as a result of climate change will also likely affect women more than men (for a further exploration see Alston, this volume).

For farmers, gender differences are also likely to affect responses to climate change, including emotional reactions of guilt and worry, both

of environmental concerns themselves, and their effects on family and community. Females are also more likely to take on extra work off-farm to supplement incomes in times of financial difficulty.

Emotional reactions

Guilt, anger, hopelessness, anxiety, fear and isolation are all connected with responses to climate change. If left unrecognised and unresolved, emotions can strongly limit behaviour. However, if climate change is framed as having anthropogenic causes, anthropogenic solutions also become possible. Hope, efficacy and purpose are required emotions when creating behaviour change.

Western culture frames happiness as being equal to possessing money and power, while excess, luxury, and even the satisfaction of personal desires may conflict with framings of frugality and denial that emerge from placing limits on behaviour in the form of reduced energy use, water use, greenhouse gas emissions, waste production etc. (Sandilands, 1999). This conflict can create guilt and even anger, which then leads to rejection of the behaviour being promoted, or of the climate change message in general. Cultural shifts in re-defining what happiness is are slow to take hold and therefore contradictions are rife in marketing and in consumer behaviour about climate change.

For farmers, the urban/rural divide is emotionally charged with feelings of guilt, blame and anger. Farmers are increasingly being separated from association with their products (e.g. in supermarket marketing), heightening this divide and worsening contentious issues that penalise particular groups, such as a carbon trading scheme.

Truth claims and contradictions

Truth claims about climate change are produced by different disciplinary frameworks built on different value systems and assumptions. These occur most obviously in marketing and branding techniques that are as contradictory as they are multiple. Language is never value free. It is always produced in context, for a specific purpose, by people with history and beliefs. These all affect language choices. This means that it is impossible to communicate climate change messages in a neutral way, and climate change communication is inherently risky (Weingart et al., 2000). Messages from multiple sources, with varying credibility and

relevance, must be combined in an interpolation of society and individual, experiences and values (Potter, 2005). Weighing up opposing values and interests is complex, and takes time and reflexive ability, especially as societal and cultural values about climate change are yet to be firmly established. Vested interests are not easily apparent – and even when they are, they can be virtually unavoidable, for example, reliance on fossil fuels. There is a lack of options which are appealing, convenient or comfortable, and therefore people's behaviours are limited (Harrison, 1996).

Power struggles

Vested interests are still incorporated into all information about climate change as power relations surrounding climate change within social and political settings are yet to be fixed and the future path is still at a crossroads. While the public arguably has all the power in consumer societies, and therefore the responsibility to act first (Diamond, 2006), the 'public' is too diverse and disorganised to act without effective models, channels and precedents being established.

Ways forward

Analysing the wider links to social infrastructure, the current political situation, cultural values, and the norms with which the messages of climate change connect to or conflict with, are as important as exploring how information is being communicated or understood by particular groups. Beyond the message or the message reception is the wider context which significantly affects how the message is converted into action. This is well understood in rural sociology and agricultural extension, but is in danger of being lost as new areas of science communication fail to connect with the valuable insights of earlier studies of behaviour change and practice change in agriculture.

Even when individual barriers or discourses that constrain action are carefully considered, action may still be resisted because of the particular context and perhaps because of overlaps between discourses. The context of climate change communication is integral to the translation of information into action because the social context is an essential part of learning, and learning is essential to behaviour change. There are many contexts implicit in learning including social, cultural

and political contexts, as well as structures, values and norms. These factors are not always harmonious with the climate change message and may create confusion, conflict or constrain choices.

The creation of multiple appropriate alternative discourses, as well as widespread awareness and critical engagement with them, is the way forward. This involves embracing complexities and localised knowledges and yet also enables individual action in multiple and variable ways that are otherwise unachievable. Understanding the wider factors through which climate change information is constructed is crucial for understanding people's learning about climate change and whether behavioural changes are resisted or incorporated into daily life.

If society constructs the problems, it can also construct the solutions (Irwin, 2001). The social construction of the problem of climate change is fundamentally a conflict over what the knowledge and facts are, and who has the power to produce them. Farmers, in particular, can either benefit or suffer from the new power relationships relating to different constructions of climate change. Understanding the particular discourses present in specific social groups is essential for research about climate change, because different discourses alter what climate change is thought to be and what it means can and should be done. Therefore, public knowledge about climate change and action taken, or resistance created, is dependent upon the context of the local, multiple, social constructions of climate change. Climate change research needs to recognise the different discourses that it encompasses and how meanings change for the social groups within these discourses.

Climate change as an issue needs to be culturally reframed from being a scientific problem with an individual focus where inaction demonstrates lack of understanding, concern or moral imperative and where information provision is the key to behaviour change, towards a more complete understanding of how societal norms and ideologies constrain behaviour through discourse. Reframing climate change in this way helps remove the sense of individual guilt and hopelessness created by individualistic calls to action and creates a greater sense of community engagement and connection (Prinzen et al., 2002). A new culture is required that counteracts the human versus nature divide and links people together in a global collective (Potter, 2005) and values

farmers and nature. Only when the social and discursive barriers to action are made visible will they be able to be addressed.

Climate change is a global environmental problem and requires a new type of collaborative global solution. Creating action needs theory to bring together the diverse disciplines of knowledge of behaviour change resistances, and techniques from the fields of adoption of innovations, extension, sociology, psychology, marketing, adult education, among others. Looking more closely at the reasons for resistance to changing behaviour can act as an agitator for highlighting the wider constraints that exist at social, cultural and political levels, and open up new ways for working around these constraints. This is harder than focusing on improving the message of climate change, but ultimately is much more likely to create change. For farmers, a new way of approaching communication that recognises the wider context is particularly important for allowing new and more effective ways to adapt to and mitigate climate change and creates discourses that culturally (re)value and empower farmers.

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Using discourse analysis to improve extension practice

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Abstract. This paper aims to create awareness of the potential of discourse analysis to be a valuable contribution to agricultural extension. By way of example, it also reports on the discourses about climate change identified as being present in the Tasmanian agricultural community. The paper outlines the theories of discourse analysis and presents the results from interviews with 63 farmers and agricultural consultants undertaken in 2008. The steps of this analysis are presented in detail to provide instruction in the potential application of the method. Four distinct discourses about climate change were found. These all have practical implication for promoting action in response to climate change and in understanding community resistance. These discourses related to issues of Money, the Earth, Human Responsibility and Information. Each of the discourses values different information and sees possibilities about action for climate change differently from the others. The four discourses are described in order to provide new insight into how climate change is framed and understood, to demonstrate how discourses limit action and to inspire greater use of discourse analysis in agriculture and extension.

The key learnings of this paper are:

- discourse analysis is useful for extension and should be more widely used
- doing discourse analysis is relatively easy, as is demonstrated in this paper
- climate change is understood in a range of ways, because of different discourses.

Keywords: extension, climate change, agriculture, discourse analysis, farmers, behaviour change.

Introduction

Climate change is now recognised by the Intergovernmental Panel on Climate Change as being 'unequivocal', as largely being caused by anthropogenic activity and as having unavoidable impacts already in place (IPCC 2007). Climate change creates a particular challenge for agriculture and agricultural extension as the impacts on agriculture are diverse, uncertain, potentially severe and with important consequences for wider society. Climate change raises many questions about how best to facilitate behaviour change and create a world that is more sustainable. Extension can be defined as 'the process of enabling change in individuals, communities and industries involved with primary industries and natural resource management' (SELN 2006, p.3). In order to respond to the challenge of climate change, there is an opportunity for extension practitioners to take greater responsibility and leadership in facilitating adaptation and mitigation in the agricultural sector, if given the required recognition, funding and support. This potential can only be realised if extension is more widely acknowledged as an agent of change, and if it is included in more diverse fields of theoretical discussion and practical application. In this way extension has the potential to be a significant contributor to the solutions of climate change, not just in agriculture, but also more widely.

This paper has two objectives. The first objective is to introduce the concept of discourse and how it might benefit extension practices in general and around climate change through describing some of the common responses to climate change that are likely to face those working in extension circles. The second objective is to show how a discourse analysis can be conducted. To explicate the methods of discourse analysis, some results of a discourse analysis of interviews with two agricultural industries are given. As the intention of this paper is not to present these result in any depth, readers interested in more detailed results are referred to Fleming and Vanclay (2009a).

Discourse

One theoretical framework which could improve extension practice is the study of discourses and how discourses shape our social worlds. Discourses are particular ways of using language in particular situations but discourse goes beyond the level of conversation or discussion:

> Words in isolation are not the issue. It is in discourse – the use of language in specific contexts – that words acquire meaning … We cannot understand the significance of any word unless we attend closely to its relationship to other words and to the discourse (indeed, the competing discourses) in which words are always embedded (Cameron and Kulick 2003, p. 29).

The discourses in which words are embedded are the culturally and historically produced assumptions, values and shared beliefs that cluster around words (Cameron and Kulick 2003). This means that language use, embedded in discourse, is not separate to the social reality or behaviour in which it occurs, but actually co-constitutive of it.

> Discourse, then, is both shaped by the world as well as shaping the world. Discourse is shaped by language as well as shaping language. It is shaped by the people who use the language as well as shaping the language people use. Discourse is shaped, as well, by the discourse that has preceded it as well [as] that which might follow it (Paltridge 2006, p. 9).

Discourses are social constructions, culturally and historically produced as a set of practices that shape people's behaviour, including language and thought. Discourses show how individuals think, how they are enabled, encouraged and normalised into seeing the world, themselves, problems and possible actions. 'Discourse is more than simply the use of language as a tool for communication' (Pettenger 2007, p. 10). Discourses shape what we can say, do and think, and therefore they determine the social consequences of our actions. Discourses are not hidden or unconscious, but are taken for granted ways of being, that, if examined, offer insights into social life and social relations (Cameron 2001). Analysis and reconsideration of discourse is a conceptually high-level, but highly effective point of action for change, because discourse is so pervasive and fundamental. Therefore, activities such as extension that focus on understanding human behaviour in order to facilitate social change should take discourses into account.

Discourses and the environment

Discourses around the environment have been explored in several disciplines (see for example Ungar 1992, 2000: Litfin 1994; Hajer 1995; Darier 1999; Dryzek 1997; Carvalho 2005, 2007). These studies are usually undertaken through analysis of media texts, policy documents or environmental movements (Kurz et al., 2005). In agriculture and extension, studies of power relations and knowledge constructions have made significant contributions to social understandings of agriculture (e.g. Carolan 2006; Wynne 1992a, 1992b; Michael 1992; Vanclay 2004). However, these have so far been achieved without any overt references to discourse. Yet discourse is fundamentally linked to power, because discourses limit and create possibilities. Discourses enact power (Foucault 1979).

Discourses are intertwined with issues of power because to know the necessary practices of a particular discourse, and to have access to the discourses that have social legitimacy in society gives an individual power. Each discourse also enacts power by designating individuals who can and cannot participate, and by defining who, or what, is deemed powerful. Discourses 'impose constraints about the possible options open to individuals and groups' (Darier 1999, p. 19). Therefore, there is still a great deal more to be discovered in the construction of agricultural power relations and discourses, because the language used by social groups in agriculture is rarely studied. Language use is especially important for the processes of extension as extension incorporates aspects of communication, education and facilitation. As Dryzek (1997, p. 9) puts it: 'language matters … the way we construct, interpret, discuss, and analyse environmental problems has all kinds of consequences'.

The consequences of language need to be explored more fully so that the relationships between language, thought and action can be brought to bear on understandings of behaviour change. Extension, as the nexus between academia and agriculture, education and farming, and information and practice, is a prime opportunity for both studying agricultural language and applying this information as a tool for facilitating change.

Extension is particularly well placed to work with discourse because extension works within the contextualised social practices which discourses describe. 'People live and act not just within one discourse … They live among a number of discourses; and so they may be able to negotiate what position they will take up' (Morgan et al. 1996, p. 70). Understanding the particular discourses relevant to each problem is therefore empowering. It creates opportunity for human agency within, movement between, or direct influence on, possibilities for the future. In many ways, this is a form of capacity building which is exactly the purpose of extension (SELN 2006).

Although discourses do not necessarily solve environmental problems, people, informed by discourses, can (Litfin 1994). Therefore, extension informed by discourse analysis can be an empowering mechanism for facilitating change. Understanding the influences discourses have on behaviour is an important step towards this change.

Climate change

Extension faces new challenges with climate change and a renewed demand for services as farmers and agricultural communities strive to learn about, prepare for, and build resilience to the projected impacts of climate change. It is considered that Australia will be 'one of the most adversely affected regions from future changes in climate in terms of reductions in agricultural production and exports' (ABARE 2007, p. 657). Agriculture is a significant producer of greenhouse gas emissions – in Australia in 2005, 17% of greenhouse gas emissions came from agriculture (Garnaut 2008). The impact of agriculture's contribution, however, is significantly increased when examining particular gasses, for example 84% of nitrous oxide emissions and 60% of methane emissions come from agriculture (Garnaut 2008). This will mean that agriculture is likely to face considerable pressure to mitigate emissions, as well as to adapt to the changes in climate already set in place. Climate change presents an urgent reason for action by farmers (Garnaut 2008; CSIRO 2008). Yet relevant information is scarce and there are many uncertainties. Extension, therefore, has a challenging task ahead and new tools to enhance understanding of the ways forward are required.

Farmers are likely to need to put changes in place before decisions about government regulations and international agreements are finalised and therefore before adequate support systems and chains of information are put in place. Indeed, some farmers may feel they are already facing climate changes worse than those projected for the future, because of current drought conditions, for example in the Murray-Darling basin. The carbon pollution reduction scheme, with or without agriculture's inclusion will have significant effects on agriculture, for which there will be winners and losers. Extension is likely to be placed under increasing pressure to help farmers cope with changes brought about by climate change that are not just bio-physical, but also social and political.

Climate change is continually being socially constructed (Pettenger 2007) and as such its 'meaning potential' (Gee 2004, p. 21) – i.e. whether climate change is taken as certain, uncertain, natural, anthropogenic, actionable, unactionable etc – changes depending on who is speaking about it, for what purpose, and in what context. This means that the discourses of climate change are complex, because competing interests and powers are still working at shifting them for their own advantage. Analysis of the discourses constructed about climate change is therefore a particularly rich site for research (see also Fleming and Vanclay 2009b; Vanclay, Leith and Fleming 2009).

Discourses demonstrate where barriers for changing behaviour exist at the wider social and cultural levels, not at the individual level or infrastructural level. As Kurz et al. (2005, pp. 616-7, emphasis in original) explain:

This barrier is not an individual, psychological one *per se*; it is not something that an individual has, like an attitude. It is also not an external, physical or structural barrier like lack of convenient infrastructure or monetary cost. Rather, it represents something that members of a society are able to *draw upon*, while interacting with other members of that society, to legitimate and justify their existing patterns of behaviour. Such discourses may also allow individuals to justify their own patterns of behaviour to *themselves.*

The following part of the paper discusses research that was conducted in a discourse analysis of farmers' concerns about climate change. Through this example, the ways in which discourses shape peoples' ideas and behaviour will become apparent so that the benefits of a discourse analysis for extension and behaviour change might be practically demonstrated and applied to other contexts.

Methods

In 2008, 63 individuals were interviewed in Tasmania from the apple and dairy agricultural communities. These individuals consisted of 22 apple growers, 29 dairy farmers and 11 agricultural consultants. The apple growers were predominantly from the southern part of Tasmania, and the dairy farmers were predominantly situated in the north. The agricultural consultants were spread around the state, in a mix of university and private enterprise.

The interviews were predominantly face-to-face and held in the home or office of the interviewee. At times, other family members or business partners were present and where possible, included in the interview. The majority of the interviewees were middle aged, white and male, with only 13 women interviewed. There were no particular specifications for the interviewees, beyond identifying with either the apple or dairy industries (or both). The interviewees were sourced through personal contact with industry leaders, attendance at group meetings, conferences and field days. The interviews were conversational in style, and open

ended in order to ascertain interviewee's dominant concerns. The interview questions were related to issues discussed in the literature and designed to stimulate verbal reflection on the issue of climate change as relevant to all spheres of life. The interviews averaged 32 minutes and the number of questions asked varied for each individual. Fewer questions than those listed below were asked if the interviewee felt comfortable to talk, further questions were asked if the individual needed encouragement or clarification. A list of typical questions is included below:

- Tell me about yourself and your farm/business?
- What do you think about climate change?
- What is climate change?
- What do you think causes climate change?
- Is climate change something new?
- Where do you get information about climate change?
- How do you think climate change will affect you and your business?
- Are you doing anything personally?
- What is your industry doing?
- What do you think of the carbon pollution reduction scheme?
- What else would you like to see the government do?
- What is the biggest risk to your business?
- How do you feel about the future of farming?
- Do you have an image you associate with climate change, for example from the media?
- What do you think about the ozone layer?
- Can you name the greenhouse gases?
- What is sustainable agriculture?
- How are you sustainable?
- What do you think is the difference between weather and climate?
- Do you talk about climate change with family or friends?
- Do you have anything else you would like to say?

There was some initial resistance to the topic of climate change, however, as the interviewer had no prescriptions, limited experience in the industry, and little background in climate science, the responses usually became more comfortable and willing to discuss, explaining industry procedures, describing personal opinions and enjoying the opportunity to reflect about concerns that 'weren't usually thought about'.

In addition to the interview responses, pertinent observations and reflections made in the researcher's journal about interview elements not necessarily captured in the transcript, such as body language and contextual information, were also recorded. Qualitative methods of analysis were used to analyse the data and to generate codes, categories and discourses. Coding means the attachment of 'labels to segments of data that depict what each segment is about' (Charmaz 2006, p. 3). First, dominant meanings in the transcripts were described (coded) at the sentence level. Descriptions of codes used active verbs to keep the codes contextual and to capture the purpose behind the words (Charmaz 2006). NVivo software was used throughout the analysis to structure and store the data and to allow easy access, refinement, notations and connections at all points of the analysis.

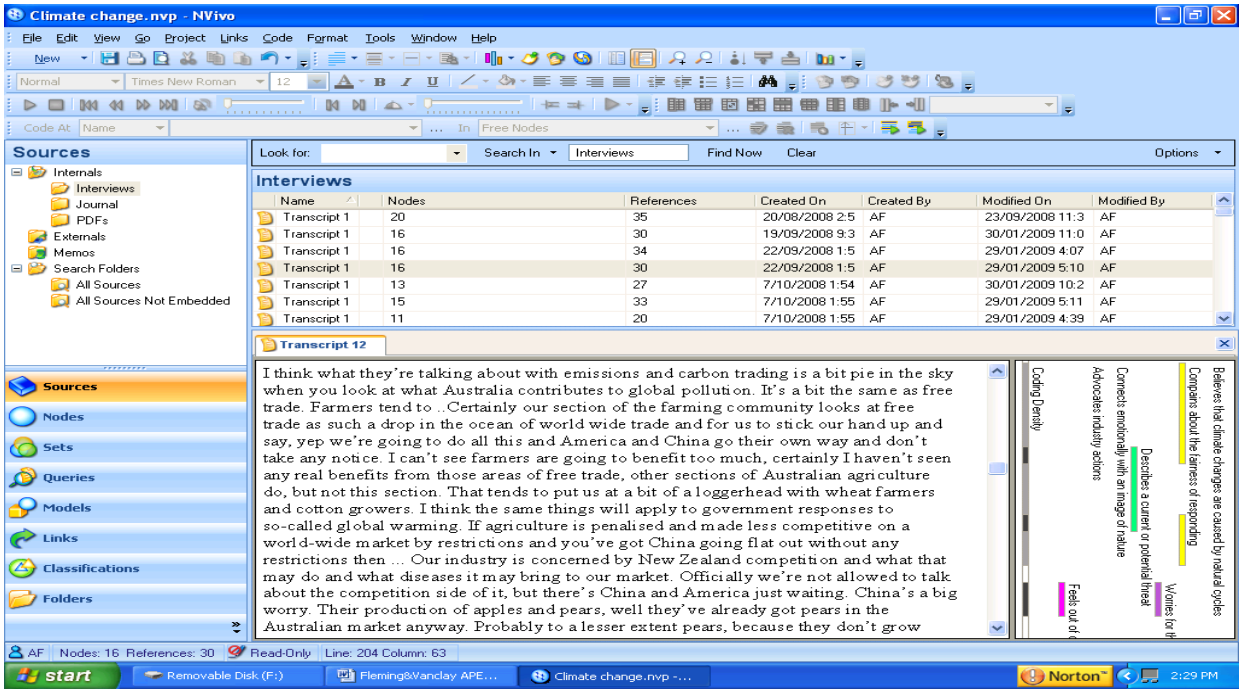
An example demonstration of coding

As the procedures leading to a discourse analysis are relatively unused in the extension field, they are explained in some detail here in order to provide instruction to others who may wish to apply this method. Strauss and Corbin (1990) and Charmaz (2006) provide further explicit instructions for coding. Figure 1 is an example of how coding works using NVivo. The sections at the right-hand side are parallel with the segments that have been coded, i.e. the sentence beginning: 'If agriculture is penalised and made less competitive' has been coded at two codes: 'Describes a current or potential threat', and 'Complains about the fairness of responding to climate change'.

After all the interview transcripts had been coded, a list of all codes created was generated. This was then analysed in order to group the codes into 'categories' – 'concepts grouped together under a higher order, more abstract concept called a category' (Strauss & Corbin 1990, p. 61). Categories are made in order to draw out deeper connections between the codes. For example, codes that achieved the same purpose but in different ways, or focused on different aspects of the same concept, were grouped together. Descriptions of each category were written up and analysed. After successive stages of analysis, the categories were again grouped into 'discourses' – 'shared meaning of phenomena' (Bäckstrand and Lövbrand 2007, p. 125) – to provide a higher level description of the points of connection between the categories. The discourses were then described in detail and further analysed to explore the tensions,

contradictions and implications of the dominant 'shared meanings' (Bäckstrand and Lövbrand 2007, p. 125) they represented. In summary, coding breaks down and conceptualises the data at an individual language or sentence level; categories put these concepts back together in new ways that shed insight into the data, and discourses group multiple categories together to demonstrate the more complex, higher level, or 'real world' consequences of language use. Figure 2 shows the hierarchy of codes, categories and discourses in NVivo. The discourse shown is 'Human Responsibility' with four categories visible: 'Action', 'Barriers to Action', 'People Power' and 'Responsibility'. The remaining icons belong to codes placed under their respective category.

Figure 1: Screenshot showing coding

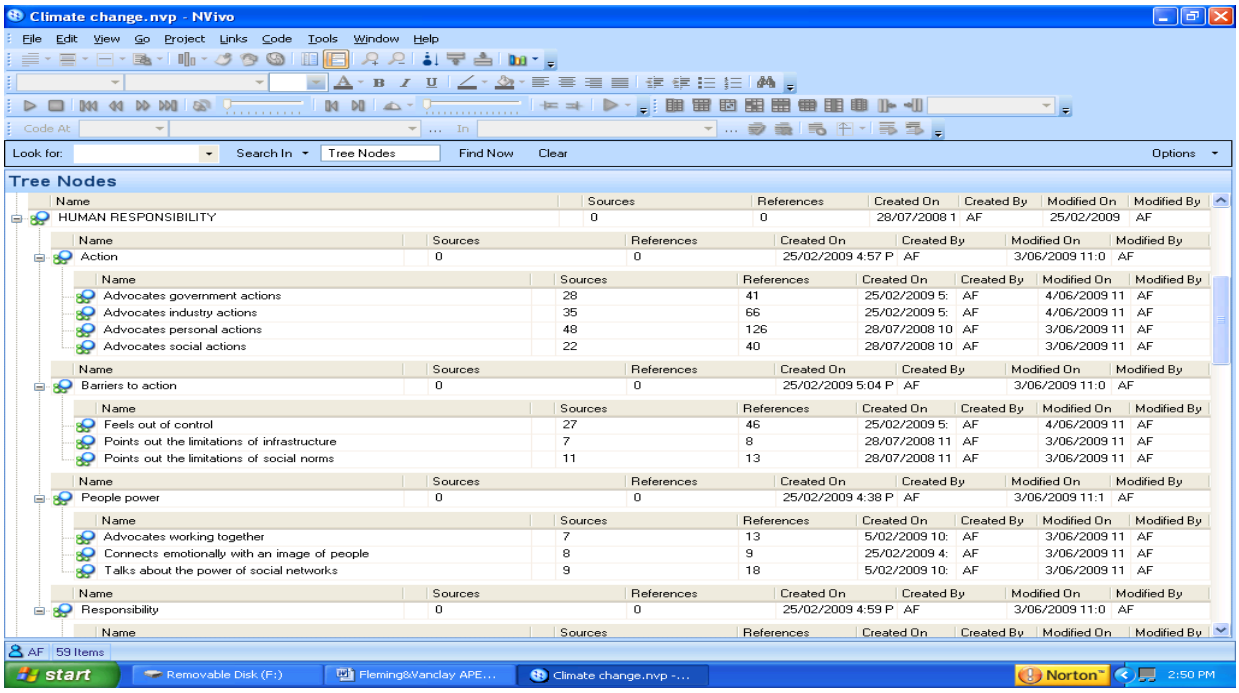


Source: NVivo 2009, personal file.

While the description above may sound relatively straightforward, it should be noted that generating discourses is a complex process, and analysis of the codes to form categories and discourses does not occur in a linear progression – it involves many stages of re-ordering, re-analysing and re-thinking to reach the level of discourses. However, even preliminary efforts of coding and constructing categories can create many useful insights into the consequences of language use and a full discourse analysis may not always be required to create benefits for extension.

Discourse analysis of this type is based on the researcher's subjective interpretation of the data that is enhanced by research questions, literature concepts and personal experiences of the interview – termed 'constructivist' (Charmaz 2006). Analysis of this sort is intended to provide insight into the data that is closely connected to issues discussed in the relevant literature and to the context of the data collection. Familiarity with the literature is used to guide all stages of the research, from the types of questions asked, to the 'lens' through which the data is viewed, and the language used in naming of the codes, categories and discourses. The analysis is therefore continually 'grounded' in theory (cf. Glaser and Strauss 1967; Strauss and Corbin 1990). Interpretations come from the data, with the literature helping to frame what is being looked for, but not necessarily the answers that are found. Current theories from the literature are applied to the data to see whether the data supports, contradicts or is relevant to these theories, but if not wholly new interpretations can be made. In this way the data is not forced into any particular frame, but continually questioned and re-examined in order to condense and connect the underlying themes in the data. This approach requires an intense period of immersion with the data and with the literature, as well as records of insights, connections, questions, tensions, refinements and decisions made about the data to be recorded as 'memos' (Strauss and Corbin 1990; Charmaz 2006), which then justify and structure the movement of the analysis from the low level codes to the more abstracted discourses. This method is following a constructivist grounded theory (Charmaz 2006).

Figure 2: Screenshot showing the hierarchy of codes, categories and discourses



Source: NVivo 2009, personal file.

Reflection at all levels of the analysis helps to enhance rigour as it demands a high level of interrogation of the data and justification of the conclusions made at all stages of the analysis. Emerging interpretations are continually tested against the data as they are being formed, to ensure the data supports the insights being drawn. Rigour is also enhanced by the analysis occurring over time, to allow ideas to settle and be re-examined afresh, as long as familiarity with the data is maintained. Objectivity is not the aim of a discourse analysis, but rather the goal is a subjective, relevant and contextual interpretation justified by the data, the literature and professional, systematic methods of data collection and analysis.

Results

In our analysis, 42 codes were decided on which were then aggregated into 13 categories and 4 discourses. It is important to emphasise that it is not the number of codes or their frequency of occurrence that is important, but rather the meanings gained from how the codes and categories are grouped. The four discourses identified as pertaining to the understandings of the Tasmanian agricultural community about climate change are explained below.

(1) The Discourse of Money

The discourse of Money is characterized by a focus on maximizing profit, maintaining economic growth, supporting technological and financial market fixes, and orchestrating opportunity through competitive advantage. This discourse sees the challenges of climate change being overcome through current cultural and social structures, namely capitalism, particularly from government and industry level led solutions. These solutions are assumed to be possible and while they may be initially expensive they represent the fairest, quickest and in the long term most cost-effective way of achieving change.

In this discourse the government is given the power of making important economic and political decisions, yet the government is not trusted to make these decisions fairly and equitably, especially in terms of industry profitability. There is a focus on the costs of action for climate change in this discourse, but the costs of inaction are ignored. Mitigating climate change is seen as too expensive and government, and society, should focus on fixing the financial crisis, and then adapt to whatever changes in climate may occur. This delay is not motivated by a sense of denial or avoidance but an assumption that predictions of extreme changes are hyped up by those with vested interests and that adaptation is an innate human capacity so that humans will 'naturally' respond to climate change. This is seen as particularly the case for farmers, who are already skilled at managing climate variability, so climate change poses nothing new, especially if the predictions that Tasmania will not have to cope with changes as significant as other areas are proven true. The perception of natural adaptation and relatively minor changes means that

the sensible path is waiting until the impacts of climate change become more apparent and then letting market forces create the necessary adjustments.

(2) The Discourse of Earth

The discourse of the Earth is about fatalism and a divine power especially Mother Nature and the cosmos. The strongest common element in this discourse is concern for the Earth and humans' negative impact on it. A simultaneous and contradictory view is that humans are so insignificant our worst efforts to pollute the world can never have a real effect. Volcanoes are often cited in this discourse as examples of how nature produces emissions for climate change that dwarf any human contributions. Climate change is seen as the culminating example of the blight of human beings on the Earth which is nevertheless insignificant compared to the ultimate power of the Earth and the universe. Climate change is a natural, inevitable process that is part of Gaia/God's ultimate plan, and whether or not humans are accelerating it, it is only because there is a divine purpose for climate change that humans cannot understand. Therefore, climate change will be fixed, if ordained, through natural cycles or other divine processes, or humans will be wiped out and the Earth will go on to an entirely different state and regain balance anew, like after the extinction of the dinosaurs. In this discourse, extinction of the human race is increasingly likely and not a source of great concern as it will occur in the far off future and the loss of the whole human race cannot be that important in the grand scheme of things, because who knows what other civilizations exist.

This discourse regards action for climate change as important for respecting the Earth and our place in it, but as largely irrelevant in the future path of the world. Climate change is seen as a positive tool for encouraging society to reconnect with nature and to live more respectfully and sustainably, not because it will change the outcome of the world, but because it is right to properly honour the sacred beauty and majesty of the Earth.

(3) The Discourse of Human Responsibility

The discourse of Human Responsibility is about the power of people. This discourse has a strong pattern of human agency and responsibility for action. While this discourse has a very positive element, about community engagement and social action driving more equitable and desirable government policies and eventually a better world order, it is held back by a lack of clear or unified sense of how to act. Stumbling blocks creating a sense of confusion or hopelessness include perceptions of the immovability of the limitations of current social structures, at the local and government levels. Central to this discourse is wanting to do something but not actually acting yet, because of feeling insecure about the actions, feeling alone in acting, feeling that there is insufficient support or because actions are too difficult. Trying to act and being unsuccessful or citing wholly unrelated actions as important are also indicators of this discourse. Society is seen to be the problem in this discourse and the tools to change society are identified as being people collaborating and working together, demanding what needs to occur using the power of democracy, yet this process is not yet achieving the major changes required to allow all the actions that are yearned for.

An interesting aspect of this discourse is the positive experiences people highlight, even when targeted objectives are not achieved. Forming closer relationships with local communities and being involved with a diverse range of people brings enjoyment to many, even if the desired end result for climate change is not yet being achieved. This discourse has potential to become a larger social movement, simply because it is rewarding for people in its own right. However, there is a long way to go if it is to grow in size sufficiently. Humans as the central cause of the problem is accepted by many in this discourse, but not all, as it is not an essential belief in this discourse that humans had to create the problem if they are to be part of the solution. This discourse builds on other less dominant, potentially growing discourses already in society that do not necessarily have any connection to climate change, including a sense of wanting to feel empowered to act to create a better world, a sense of wanting to overcome alienation, loneliness and redundancy and wanting to feel connected to what is really important in life, including the environment, but more especially, other people.

(4) The Discourse of Information

The discourse of Information is about indecision and avoidance. It is also about focusing on aspects of uncertainty, and the need for more knowledge about climate change. There is commonly a rejection of responsibility and/or ability to understand or adequately judge and implement information. Confusion and doubt are key features of this discourse. Distrust in information is likely to be actively cultivated so that denial and avoidance can be justified. Nothing in climate change is black and white and everything is arguable and contested. Information is likely to have been sourced and either found too confusing, too complex, too

distant, or too difficult to understand. In this discourse, further attempts to engage with finding more information, talking about the issue or thinking reflexively about it are avoided until such a time that the answer is sufficiently clear and simple and legitimated by someone else. This involves waiting for others to synthesise the information and come up with a position that is generally accepted and supported and can then be taken up, thus avoiding the difficult process of personally evaluating all the information. At the moment the most easily adopted positions about climate change are either total rejection or sitting on the fence.

Also included in the discourse of Information is the belief that climate change will not have very negative effects until far into the future and so there is time to act later, when Australia can be more favourably positioned in relation to the political and economic situation in the rest of the world, for example, after carbon trading has been trialled in other places, after the economic crisis is over or after the impacts have become more obvious etc. In this way, other issues are seen to be more important and act as excuses that justify delay. Delay is encouraged in this discourse so that personal actions are not required, because needing to act involves facing further uncertainties and decision making. In this discourse there is a strong hope that climate change will go away, that it will be disproven, the hype will die down and everyone will forget about it, or it will not create any major changes until the distant future and so will not have to be dealt with personally. It is common for this discourse to involve a negative reaction from some other issue, like the Y2K phenomenon, and past experiences with failed trust are likely to make neutral thinking about climate change difficult.

Conclusion

This paper described four discourses that were present in discussions about climate change in an agricultural community in Tasmania. These discourses surrounded issues of Money, the Earth, Human Responsibility and Information and each framed the issue of climate change in different ways, with significant implications for how climate change was understood, what actions for climate change were seen as important, and how barriers to action were created.

Through this analysis, this paper has aimed to highlight the importance of language in shaping behaviour. Through this, it has aimed to make apparent the benefits of awareness of discourse for agricultural extension and to give some instructions for the methods of examining language more closely. This paper argues that examining language is a useful technique for extension in order to enable engagement with different community perceptions and understandings about climate change, which are essential to address when aiming to facilitate change.

The complexity of the issue of climate change, in cause, effect and social response, is fertile ground for other explorations of discourse in agriculture. Extension has an opportunity, and perhaps a responsibility, to use its theories, skills and practices to help agriculture respond to the challenge of climate change and to expand into new directions that offer fruitful theoretical and practical applications. Discourse analysis offers one such new direction.

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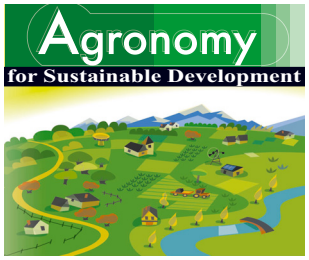

Review article

Farmer responses to climate change and sustainable agriculture. A review

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Abstract – Climate change is a major issue for agricultural sustainability, and changes in farming practices will be necessary both to reduce emissions and to adapt to a changing climate and to new social expectations. A complicating factor is that the processes of behaviour change are complex and can be slow to occur. Discourse analysis is useful in understanding how the discourses farmers are embedded in contribute to resistance to change. Discourses are particular ways of using language in particular situations. They have wide ranging effects on beliefs, values and behaviours. Interviews were conducted in 2008 with 63 respondents, including 22 apple growers, 29 dairy farmers and 12 agricultural consultants in Tasmania, Australia. In undertaking a discourse analysis of the transcripts of these interviews utilising N-Vivo, four specific discourses were identified as being important in shaping farmers' perspectives of climate change and sustainability: Money, Earth, Human responsibility and Questioning. Each discourse contributes to resistance to changing behaviour in particular ways. An understanding of these discourses offers a new approach to facilitating behaviour change.

climate change / agriculture / sustainability / discourse analysis / discourses / behaviour change / resistance / barriers to adoption / Tasmania

Contents

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1. INTRODUCTION

'What's sustainable? You've got to look at our world as we know it. We're not in a sustainable position at the moment. That's why I say what is sustainable – I don't know.' Interviewee.

Sustainability is a concept that is relatively easy to understand but difficult to define in practice. At a simplistic level, it means good environmental management and farming communities that are profitable and prosperous, or put another way, that are viable and vital. But what this means in practice and what specific management practices it infers is open to much debate (Vanclay and Lawrence, 1994, 1995). While sustainability has typically been conceived in terms of land degradation issues, over time sustainable agriculture has had to address a range of other issues including energy use, artificial inputs such as fertilizers and agricultural chemicals, and now climate change.

Climate change is increasingly acknowledged and accepted in science and political arenas. The emerging reality of climate change potentially increases the level of concern about issues of sustainability generally. Many agricultural industries will be impacted by climate change, and agriculture in Australia is projected to be especially affected (ABARE, 2007). Agriculture is likely to face considerable pressure to change its practices to become more sustainable for climate change, both in terms of mitigating emissions of carbon dioxide, nitrous oxide and methane, as well as adapting to the consequences of changes in climate already set in place. The consequences of climate change will be wide ranging, including physical changes to the landscape as well as expected changes in government requirements and market demands. There is a perceived urgency for agriculture to change to mitigate current greenhouse gas emissions and to prepare for future climate scenarios (e.g. CSIRO, 2008; Garnaut, 2008).

Despite the demand for action, few in the agricultural community are actually changing their farming practices because of climate change, at least in Australia (Milne et al., 2008). Potential reasons for inaction are diverse – doubt, complexity, avoidance, and the belief that others are responsible are just some of the likely responses that can limit action. Understanding the causes of this wide variety of responses from a social perspective can reveal new and potentially beneficial insights into behaviour (Potter and Oster, 2008). Therefore, more social research into understanding the factors that limit action for climate change, and how to overcome them, is needed (Trumbo and Shanahan, 2000; Moser and Dilling, 2007).

Climate change occurs on a global scale and over a period that is so long that many people find it difficult to relate to. Thus, the actions needed to influence the climate may be difficult to accept (Flannery, 2005). Further, people have different interactions with climate and understand it to be different things, varying from the expected weather, to the number of extreme events, to the level of carbon dioxide in the atmosphere. Climate change is socially constructed differently in different contexts by different social groups based on the different understandings (Pettenger, 2007). Advocates of change need to be aware of the perceptions of climate change that are prevalent in their particular target groups, and need to be able to deal with a diversity of responses, because the ways in which problems are framed and perceived are crucial factors in determining what solutions are seen to be possible (Irwin, 2001). Yet, when it comes to issues of sustainability and climate change, how farmers' social understandings are constructed is not well understood (Lowe et al., 2006). Knowledge about how social responses are generated in agriculture offers a new perspective in how to create alternative, more positive responses and hence facilitate change (Vanclay, 1992, 2004; Vanclay et al., b).

This paper aims to contribute to the social understanding of climate change by demonstrating how the discourses that all social groups are embedded in are crucially linked to the behaviours that are able to be enacted in that group. Discourses fundamentally shape how all concepts are spoken about, and thought about, and thus able to be acted on (cf. Foucault, 1972). Therefore, discourses provide important knowledge of the forces that shape public perceptions and reveal the processes by which climate change is socially constructed. Awareness of discourse is a practical approach because, if the ways that environmental problems are socially constructed are better understood, a range of solutions can be tailored to fit. This paper aims to link the literature advocating action for climate change with the theory around discourses, and argues for a more socially aware understanding of agriculture and farming. It is hoped that this will offer a new, more successful method for promoting change in farming practices towards sustainable agriculture (see also Fleming and Vanclay, 2009a, b).

2. DISCOURSES

The concept of discourse was introduced in the 1960s by the French philosopher, Michel Foucault. Foucault (1972) maintained that the way language is used has consequences for a whole range of things that go beyond the level of individuals or disciplines, to the very structures of society that shape and limit how people are able to speak, think, and act, and to the social structures that are developed accordingly. Discourses are particular ways of using language in particular situations. They exist at the level of a social group and serve to transmit and construct culture, pass on traditions, question the world, and are fundamentally important in the way we construct our identities.

'We speak with the voices of our communities and to the extent that we have individual voices, we fashion them out of the social voices already available to us, appropriating the words of others to speak a word of our own' (Lemke, 1995, 24–25).

Discourses shape the way we use language. Exposure to particular discourses over time creates perceptions about what is right and wrong, normal or abnormal, and thus significantly shapes how we think and act. This means that discourses are influential social constructions that should be examined, particularly in relation to behaviour change. While the study of discourse is a growing component of many academic fields including environmental studies (Harrison et al., 1996;

Darier, 1999; Dryzek, 1997; Hajer, 1995; Carvalho, 2007; Kurz et al., 2005; Bäckstrand and Lövbrand, 2007), the potential for studying discourses as a practical approach to facilitating behaviour change is yet to be realized.

Discourses work toward normalisation and act in opposition to other, competing discourses, and therefore are dynamic and in a state of constant change (Wetherell et al., 2001). However, discourses can be actively changed because the constraints that discourses impose are open to challenge (Darier, 1999). Conflict between discourses creates a point of opportunity for developing new discourses. With an awareness of how a discourse is operating, it becomes possible to conceive how that discourse might be different, or to consider that a different discourse should be adopted, or even to create a new discourse altogether. Therefore, resistance in discourses is a site for agency and transformation. An analysis of resistance in discourses can offer useful insights into behaviour change and it can help to demonstrate the points where new discourses, with new actions and possibilities, might begin.

3. METHODS

In 2008, interviews were conducted with 63 individuals from the apple, dairy and agricultural consultant communities in Tasmania, Australia. Sourced through personal contact with industry leaders, the interviews were conducted on-farm, or in-office, taking an average of 40 minutes. The interviews were conducted in a semi-structured manner suitable for recording people's feelings and perceptions. Indicative questions included: What do you think about climate change? What do you think are the causes? What are you doing about climate change on your farm? What do you think should be done by others? What is sustainable agriculture? How are you sustainable? What is your biggest risk? What do you think of the carbon pollution reduction scheme? What else would you like to see the government do?

The questions were intentionally open-ended to allow responses to be freely given and to limit the input (and potential bias) of the interviewer. The interviews were transcribed, entered on an N-Vivo database and examined using a constructivist grounded theory approach (Charmaz, 2006) and a discourse analysis methodology (Wetherell et al., 2001). The discourse analysis involved searching for themes relating to resistance to action for climate change. The analysis of these interviews and a corresponding literature survey are the basis of this paper.

4. FARMERS' THOUGHTS ABOUT CLIMATE CHANGE

Most interviewees thought that climate change was occurring, and about half believed that they had made personal observations of landscape change, or change on their farm, that they linked to climate change. Yet despite accepting that climate change was occurring, only some thought it was anthropogenic in origin and many were undecided about the cause. Only some believed that it is necessary to mitigate the causes of climate change and/or are willing to do so. They believed that others had more responsibility to act. Some believed that the major responsibility for action lay with government, and that it is pointless for individuals to act without government leadership. Many were concerned about the inclusion of agriculture in the proposed carbon pollution reduction scheme. They were particularly distrustful of various intended government actions which they saw as penalizing farmers.

A small number were confused about the concepts of greenhouse gases, ozone depletion and weather, often conflating these with climate. This group was unable to name any greenhouse gases, and believed the hole in the ozone layer was related to climate change.

Most saw opportunities for Tasmania in a changed climate. They expected Tasmania to be sheltered from the worst effects of climate change and, therefore, compared to the rest of the nation and the rest of the world, to be relatively benefited. More broadly, however, many were worried about the future of the world for their children and grandchildren.

5. FOUR DISCOURSES OF CLIMATE CHANGE

Our analysis of the transcripts through subsequent levels from codes and categories to themes and discourses (Fleming and Vanclay, 2009b; Strauss and Corbin, 1998) resulted in four discourses being identified. Each of the four discourses shows a distinctly different way of talking and thinking about climate change. These are discussed below and, following these descriptions, are contrasted with each other in Table I.

5.1. The discourse of money

In the discourse of money, nature is understood as a resource to be monitored, controlled and maximized, and sustainability is about continuing productivity and profit. The main concerns of climate change are about the ongoing viability of business and consistency of action at an international level. Climate change, in the form of a major disruption, is not a concern because physical changes are assumed to be gradual and are expected to be overcome through adaptation. Therefore, how people, governments and other countries act is more important than how the environment changes. There is concern about the equity of actions that might be taken to address climate change. Fairness would demand that everyone acts equally, yet this is not practical as everyone has different capacities and responsibilities for action. The government is not trusted to manage these different capacities and responsibilities effectively, especially in terms of the financial restrictions or taxes they will impose. Finally, individual actions are not accepted as important enough to be contributing to the problem and therefore it is pointless for individuals to act alone.

The discourse of money is characterized by a focus on maximizing profit, maintaining economic growth, supporting technological and financial market fixes, and orchestrating opportunities to maintain competitive advantage into the future. This discourse sees climate change as being able to be overcome

Table I. Comparison of the four discourses that are influencing Tasmanian farmers.

	Money	Earth	Human responsibility	Questioning
What is nature?	A resource to be monitored, controlled and maximized	A gift to be left untouched and respected	A system that is fragile and needs protection	A system that is infinitely complex, but potentially knowable
What is sustainability?	Continuing productivity and profit	Preserving the purity of nature	Protecting nature for future generations	A better future made possible by ongoing technological and scientific progress
What is climate?	Expected conditions for production	Natural cycles	The experience of weather over time	A scientific understanding based on models and historical records
What is drought?	Exceptional circumstances, business risk	Unpredictable natural event	Reason for better land management	A separate, but compounding issue; climate change is not climate variability
What is climate change?	Future business risk, unfair financial cost in relation to mitigation and adaptation	Natural event	A justification for calling for major change	A complex process, which appears to be taking place. More knowledge needed
What is the cause of climate change?	Multiple causes. Anthropogenic causes often seen to be accelerating a natural trend	Natural process	Anthropogenic is typically accepted but not a defining feature of this discourse	Anthropogenic causes are cautiously accepted, with the complexity of multiple causes emphasised
What is climate change in Tasmania?	Sheltered from extremes, less affected than elsewhere	No different to anywhere else	An opportunity to lead and set an example	Uncertain; current information is inadequate and more detail is needed
What is farming?	A way for earning financial reward through hard work	A life close to nature	Providing an essential service	An application of skill, knowledge and technology
Who has responsibility for solutions to climate change?	Government, corporations, industry bodies, consumers	Gaia, God, the cosmos	All people equally	Future researchers will have a major role when we learn more; current research contributes to the knowledge base
How is science perceived?	Potentially useful, can be complex and may need translation to be practical	Often irrelevant	Science has a role in creating solutions	Science is useful, and skepticism is an important scientific trait
How are global concerns e.g. terrorism, financial crisis, perceived?	Increase business impacts and opportunities	Shows failure to respect nature	Shows need for social transformation	Adds another layer of complexity

through current cultural and social structures, namely market forces and innovation. As solutions to climate change are assumed to be possible, climate change is only perceived as a threat in terms of what decisions are made to inhibit production or penalise agriculture. The solutions are also assumed to be primarily technological and, therefore, agriculture as an industry needs to be especially careful to stay in line with what others do in order to remain competitive. Locally, Tasmania is seen to be particularly sheltered from major environmental impacts, and therefore there may be potential to benefit from climate change, if the only difference is a few degrees increase in temperature.

In the discourse of money, desirable farming practices centre on concerns about effectiveness, efficiency, market relationships, and industry positioning. Farmers' capacities to act for climate change are hindered because costs are perceived as being high, the effectiveness of action unproven, and action is seen as being detrimental to competitive ability. A wait and see approach is favoured, because how others act is crucial for positioning. These views inhibit those in this discourse from acting now, or in supporting Australia to act independently, despite arguments that the costs of inaction are likely to be greater than the costs of action (Garnaut, 2008), that Australia is likely to be particularly affected by climate change, that Australian farmers are particularly likely to suffer this burden financially (ABARE, 2007), and that adaptation is a finite process and unlikely to be sufficient to respond to climate change (Howden et al., 2009).

5.2. The discourse of earth

This discourse focuses on the earth and has as a key feature, 'Mother Nature', a divine metaphorical personification that embodies creative and restorative power. While there is concern for the negative effects on the environment that humans are causing, there is a belief that these are sufficiently insignificant to have any real effect and that the world will persist relatively unchanged. In other words, the earth has the power to endure. There is a strong sense that humans do not have dominion over the earth but that the earth has dominion over humans. There is also the sense that the earth is vast and beyond human comprehension.

In the discourse of earth there is a sense that because climate change is controlled by an external force, it might be part of a divine purpose and therefore not of any great concern. In this view, climate change will potentially provoke natural evolution of humans and other species, or humans may be wiped out but the earth will endure albeit in a different state, as occurred with the extinction of the dinosaurs and other major events.

Desirable farming practices in this discourse centre around respect for nature. Farmer's capacities to act for climate change are hindered because humans are not perceived to be able to influence the state of the planet, and the earth has a considerable capacity to withstand change, or homeostatic capacity. Climate change is seen as one aspect of 'the category of environmental insults deriving from industrial society' (Bulkeley, 2000, 319). Equally important problems are degradation, pollution, extinction and the use of environmentally-unfriendly products. While all of these problems are undesirable and even immoral, they are nevertheless not actually able to affect the earth's equilibrium. There is sufficient mystery and trust in the incomprehensible workings of the planet that human attempts to direct the future are naïve and inconsequential.

5.3. The discourse of human responsibility

This discourse demonstrates a fundamental difference from the two discourses already discussed because, instead of financial or environmental concerns, it focuses on social action. The discourse of human responsibility is about the necessity of acting for climate change and working together to communicate, collaborate and participate. This discourse has a strong sense of agency and responsibility for action. While it is positive and focused on social action, it is held back by a lack of clear direction in what actions to take.

This discourse is primarily about achieving more public engagement with climate change and about creating more equitable and desirable government policies and even a better world order. However, this is a grand plan and climate change can get lost amidst the focus on transformations of social structures that are demanded. Society is seen to be the problem in this discourse and the tools to change society are identified as being people collaborating and working together, demanding what needs to occur using the power of democracy, yet this process is not actually achieving the major changes required to allow all the actions that are yearned for.

Desirable farming practices in this discourse centre on concerns over the capacity of farmers to meet their responsibility to feed the world's increasing population. The ability of farmers to act for climate change is hindered because actions are inhibited by the need to continually increase output and because of the limitations of current infrastructure, social systems and social norms. Changing consumption patterns and environmental values are seen as being essential in this discourse, but this requires system level transformation, which at this stage is still only being talked about and not yet incorporated into action (see also Harrison et al., 1996).

5.4. The discourse of questioning

The discourse of questioning is created through the interplay of the hegemonic power science has, which is propagated by the media, but moderated by public opinion. This discourse is focused on issues of fact, truth, knowledge, information and trust. It emphasises aspects of uncertainty or incomplete knowledge, and the complexity of the issue. Vested interests are seen as being likely to exaggerate climate change, and while there is probably some element of truth in how humans cause negative environmental impacts, the extent to which this occurs and how these are best addressed is still unknown and unable to be discerned until the emotional hype has subsided.

The discourse of questioning has doubt and the quest for more knowledge as its key features. Controversial or emotional information is likely to be distrusted and rejected. In this discourse, nothing about climate change is black and white, and everything is arguable and contested. Information is likely to have been found too confusing, too complex, too distant, too tainted, or too difficult to understand. In this discourse, further attempts to engage with finding more information, talking about the issue, or thinking reflexively about it are avoided until such a time as the answer is made sufficiently clear and legitimated by more scientific endeavor. This involves waiting for others to synthesise the information and come up with a position that is generally accepted and supported. At the moment, the most easily adopted positions are either total rejection, or sitting on the fence.

Desirable farming practices in this discourse centre on specialist knowledge and skillful application of technology. Farmers' capacities to act for climate change are hindered because climate change is too uncertain to be actionable, too controversial to be entirely true, and the required changes too radical to be trusted. In this discourse, trust is a particularly important issue, especially trust in whose knowledge and whether that knowledge relates to personal contexts (see also Carolan, 2006).

6. DISCUSSION

The general perceptions about climate change of Tasmanian farmers as identified in this research are generally consistent

with those found by other studies into public responses to climate change (e.g. Moser and Dilling, 2007; Milne et al., 2008; Lorenzoni et al., 2007; Doulton and Brown, 2009). However, very little research has examined farmers' discourses surrounding climate change for us to compare with our results. This paper seeks to emphasise that responses to climate change are a product of social, rather than individual processes, and therefore more research that takes account of the operation of discourses should be undertaken. We believe that many of the root causes for inaction in the face of climate change are social and discursive. Only a wider account of these social discourses can explain behaviour and thus, resistance.

Many studies of public responses to climate change choose to focus on problems with information, or individual psychology, which are often named the 'barriers' to action (e.g. Bord et al., 2000; Stamm et al., 2000; Stoll-Kleeman et al., 2001; Leiserowitz, 2007; Bostrom and Lashof, 2007; Kollmuss and Agyeman, 2002). While this literature offers important insights into understandings of climate change at an individual level, we believe that there is no such thing as a barrier to change, only legitimate reasons not to change (Vanclay, 1992, 2004). The processes by which these reasons are deemed legitimate or otherwise can be made apparent through analysis of discourses. We argue that a social focus on behaviour change is more useful in relation to facilitating action for climate change than a focus on the specific barriers to change, because it is only through a social approach that the 'practical and discursive constraints of context, both locally and nationally' (Harrison et al., 1996, 215) can be properly addressed.

The many explanations as to why people do not change behaviour that are discussed in the literature can be generally categorized into groupings around conceptual, practical and information barriers. These are summarised below in order to restate our belief that it is not as useful to find out the barriers to action as it is to properly understand the legitimate reasons for inaction. By describing the large number of individual barriers below, we hope to show how overwhelming change can be, if each barrier is to be addressed individually. Instead, we advocate a focus on discourse that offers a more holistic and thus more effective way of understanding and addressing inaction and resistance.

6.1. Conceptual barriers to climate change action

This grouping comprises the many arguments given as to why people can not comprehend climate change due to its complexity. In these arguments, climate is perceived to be a complex science created by multiple interactions between the oceans, land masses and the atmosphere. There are complex effects of climate on the environment, including, but not limited to, the weather. These effects occur over long time scales of years, decades and centuries, so cause and effect connections are difficult to establish and cycles are not often experienced by individuals and/or not accurately remembered. Climate systems and climate cycles are created on a scale that make it seem too distant and too abstract, or too vast and unalterable (Moser and Dilling, 2004). Public understanding of climate change is reliant on science to discover, monitor and potentially solve the problem (Demeritt, 1998), and the media is seen as the conduit for this information transfer from science to the public.

Conflicts between science and the media and the public about truth, values, knowledge, power, responsibility for action, and agency have been the focus of many studies about climate change and environmental sustainability (Potter and Oster, 2008; Boykoff, 2008; Carvalho, 2007; Lorenzoni et al., 2007; Kurz et al., 2005; Sarewitz, 2004; Jasanoff, 2004; Clover, 2003; Princen et al., 2002; Dryzek, 1997; Hajer, 1995; Ungar, 1992; Litfin, 1994). While some of this research does use discourse, it is our belief that this has so far been insufficient.

6.2. Practical barriers

Another category of barriers to change can be conceived as relating to the practical dimensions of the posited solutions. In the conventional diffusion of innovations literature, these include available time, money and social infrastructure, as well as considerations of convenience, ease, flexibility, divisibility, referring to the breakdown of a change in behaviour into the required steps (Rogers, 1983; Vanclay, 1992, 2004; McKenzie-Mohr and Smith, 1999; Pannell et al., 2006). The individual states of motivation, risk, resources, support, individual character traits and skills also play a part. In relation to climate change, Moser and Dilling (2007) have outlined similar barriers to action.

Some scholars advocate a different, more social level approach (Potter and Oster, 2008; Lorenzoni et al., 2007) to change the social structures that limit these behaviours, and to create social mores to normalise the desired behaviours (Griskevicius et al., 2008). We see these as being complementary aspects of the broader concepts of changing discourse. Discourses influence the language used to talk about issues, the types of institutions needed in society and the way these institutions are used (Phillips and Jorgensen, 2002). Therefore, discourses are fundamental in understanding behaviour.

6.3. Information barriers

The final category of barriers is problems of information and its communication. While the critique of the view that the provision of information alone does lead to behaviour change has been well-established since the rise of what is called the 'information deficit model' (see Potter and Oster for a review) some, for example, Sturgis and Allum (2004) still believe that the provision of information will change behaviour. They are not alone in this view as it is widely shared by many scientists.

In the view of those who think information will solve the problem, they see 'information' in simplistic, 'objective' terms, and not in its social context. The barriers to change that these people consider are the lack of information, the lack of access to information, problems in the targeting of information, and the lack of ability of people in understanding the information. There is the view, too, that in a society which is

potentially overloaded with information, many people lack the ability to find the information they need, or lack the necessary tools and intellectual resources to evaluate the competing information that is on offer.

In our view, behaviours are embedded within different contexts and situations, and are linked to institutions, social networks and the contexts of place. These must all be considered and adapted or transformed with the adoption of even seemingly simple behaviour changes. We consider that 'problems' or 'barriers' should not be addressed individually, but should be included in the overall account of the reasons for behaviour which we see as being discursive. Changing behaviour on an individual scale is slow and likely to be resisted at many points: 'behavior change is not a one-by-one persuasion task, but a social challenge' (Tribbia, 2007, 248). This is a challenge achievable through working to change the discourses that currently limit behaviour.

7. OPPORTUNITIES FOR CHANGE

From the four discourses we have found operating in agricultural circles in Tasmania, there are points of opportunity for change. By understanding the way issues are framed and understood in particular discourses, the ways forward can be framed in a corresponding fashion. This can minimize misunderstandings and tap into existing motivations for action. In this way, an understanding of which discourse is operating in which context can provide a social insight into farmers' characters and positions.

The discourse of money sees resistance to changing practices for climate change as the best way to avoid costs, to focus on other more important problems and to allow time to learn more and therefore increase the likelihood of being more competitive when implementing actions later. However, those who are influenced by this discourse can be motivated to support action by stimulating their need to maintain competitiveness and to be involved with climate solutions developed by industry. To increase the desire for, and adoption of, actions in this discourse, the potential financial benefits and future costs need to be clearly identified. Information about how others are responding, especially at government, industry and consumer levels, is especially important. In this discourse, emphasis on the human responsibility for the environment and emotionally-laden tactics are unlikely to be successful unless tightly connected to issues of financial concern. Therefore, explicitly highlighting the connections between financial problems and climate change, for example reducing input costs by addressing climate change, is of more use than describing other general impacts, no matter how catastrophic, that have financial consequences merely implied.

The discourse of earth resists action for climate change because it sees any action humans can take as being too small and/or irrelevant to make a difference. This discourse sees that other forces are in ultimate control of the earth, and humans cannot affect the outcome of the future path of the planet, or the future of the species. However, this discourse supports action by wanting to promote the value, goodness and wonder of nature and caring for it in a way that is properly respectful and grateful. The best way forward for increasing action in this discourse is by highlighting the multiple environmental benefits of climate change action and emphasising the cultural shift toward sustainability, that is, respect for the earth, that is required. Promotion of the anthropogenic origins of climate change will not be an effective, or necessary, way to promote action in this discourse.

The discourse of human responsibility resists action for climate change because there is confusion about what to do and how to practically implement actions, especially because of concerns about major barriers that are seen to be impossible to fix, like social and governmental structures. However, there is a great deal of willingness to act and therefore significant untapped potential for action is demonstrated in this discourse. If given the resources, those in this discourse are likely to take action up quickly and this is also the most likely discourse to create new forms of action. In this discourse, emphasising the practical information about climate change actions, particularly those involving community or group interaction is the best way forward. Highlighting the reasons for action, or the urgency of action, will not be effective in this discourse as the desire to act is already present and further emphasis can overwhelm. Instead, demonstration of practical ways forward and providing social contacts and the framework for networks will be the most beneficial.

The discourse of questioning resists action for climate change because of distrust or dissatisfaction with information or perceptions of the inability of people to understand or relate to information. This discourse advocates avoidance, denial and delay. However, it has the potential to support action because it accepts that some knowledge is already available for how to proceed. It trusts scientific pursuit to eventually provide the answers and accepts that progress is achieved incrementally, so some action is advisable now. In this discourse, information about the potential benefits of actions needs to be highlighted, rather than information aimed at overcoming scepticism about the causes. In effect, showing this discourse that they too have a vested interest in acting on climate change, and a role to play in producing relevant, 'on-the-ground' knowledge about action for climate change, is the best way forward.

8. CONCLUSION

Each of the discourses identified through our interviews with members of the Tasmanian agricultural community shows a distinctly different way of framing the issues of climate change and sustainability. These are: as an issue of business viability; as an environmental concern; as a call for social action; or as a problem of trust and information. Knowledge of which of these discourses is at work within different social settings allows for different approaches for facilitating behaviour change to be implemented. Each of the discourses provides points of opportunity for action by focusing on the particular aspects that are central to the discourse and that would therefore motivate change by highlighting issues of financial

benefit, environmentalism, social action or trusted knowledge respectively.

Climate change means that sustainability is more important than ever, but still understood in a diverse range of ways. Australian agriculture is going to be under significant pressure to implement a wide range of changes in practice for adaptation, mitigation and social responsibility. A social consideration of the agricultural community's behaviours and perspectives is now even more important to consider. More effective approaches to understanding behaviour change are needed because of the urgency of action for climate change. The diversity of social understandings and responses to climate change and sustainability mean that a new method for facilitating change is required. In order to cope with diversity, this new method needs to be focused on a social level of change in order to have a meaningful and significant effect. Awareness of discourse is the most appropriate tool for achieving this level of change.

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ANTARCTIC CLIMATE & ECOSYSTEMS
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climate futures for tasmania

local climate information for local communities

communicating climate change in the agricultural sector

A study in communication

Climate Futures for Tasmania believes it is important to understand how best to communicate climate change to the community. To help us in our communications, we are supporting research in the Tasmanian Institute of Agricultural Research (TIAR) into ways the agricultural sector sees or 'frames' climate change.

The research looks at different understandings of climate change in agricultural settings. In particular, the research has been looking at the different perceptions, world views, or paradigms that different people in agriculture have and the implications this has for communicating about climate change.

A discourse analysis of interviews was conducted with people in the agricultural sector. The research shows there are four key ways that climate change tends to be framed. Being mindful of these different views offers guidance into how communication about climate change should be best facilitated.

A crucial part of knowing the audience for communication about climate change includes understanding the world views that shape their understandings of key issues and relating this to all communication about climate change.

Four perspectives on climate change...

A. Financial Concern: where climate change is perceived as a financial concern, aspects for financial opportunity should be highlighted and disaster narratives avoided.

B. Natural Cycle: where climate change is perceived as a natural cycle, actions for sustainability should be highlighted and an emphasis on anthropogenic causes avoided.

C. People's Concern: where climate change is perceived as an issue for human responsibility, actions for networking and collaboration should be highlighted and an emphasis on urgency of response avoided.

D. Confusing: where climate change is perceived with distrust and rejection, actions for climate change that involve farmers in information generation should be encouraged and the care taken not to provide too much 'expert' information.

Ways of seeing climate change...

If multiple perceptions of climate change exist within one group it represents a positive way to promote multiple options for climate change.

Awareness of different perspectives of climate change, such as the four above, means that communication about climate change to family farm businesses will be more effective and productive.

What we know from the literature:

Guidelines were developed from the literature about extension and climate change communication. These guidelines were were collated as part of a literature review for the research.

1. Communication to farmers means working with diverse family farm businesses so there are multiple and personal considerations involved.
2. Prescriptive recommendations or perfect messages are not possible because there are complex and diverse understandings of climate change.
3. When communicating about climate change, an understanding of the varying social contexts and engagement with farmers' personal situations is essential. In other words, it is important to know your audience and be aware of diverse farming styles and learning styles.
4. As climate change means different things to different people, it is useful to develop shared definitions of climate change within each group as a way to develop engagement and facilitate action.
5. Information transfer is not useful. Information may be important but if it is inflexibly supplied to farmers from experts, it is likely to be resisted.
6. Multiple possibilities for action need to be encouraged. Climate change practices need to be integrated into the whole of farm operations and can have multiple benefits not necessarily solely for climate change.
7. Opportunities for farmers to work with each other to participate in sharing knowledge and experiences about climate and possible climate actions are important. This encourages social learning, engagement and ownership.
8. Recognition of farmers who have implemented successful changes is valuable.
9. Awareness of other information about climate change that farmers have already received is important to avoid repetition, confusion or contradiction. This means that awareness of current media and other communications from organisations, industries and policy is useful.

Climate Futures for Tasmania

Climate Futures for Tasmania is an externally funded, collaborative research project that is generating improved climate change information for Tasmania. It is a project of the Antarctic Climate & Ecosystems Cooperative Research Centre.

Making sensible choices on how people can adapt to climate change, hinges on understanding what changes are likely, where they are likely, and when they will start to have a significant impact.

In a first for Australia, and possibly the southern hemisphere, Climate Futures for Tasmania is generating local climate information over the 21st century for local communities.

Climate Futures for Tasmania uses this research to inform their communication practices. PhD student, Aysha Fleming is supported by scholarships from University of Tasmania, CSIRO and Climate Futures for Tasmania, and is supervised by Professor Frank Vanclay and Dr Shaun Lisson.

Further Reading

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local climate information for local communities

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